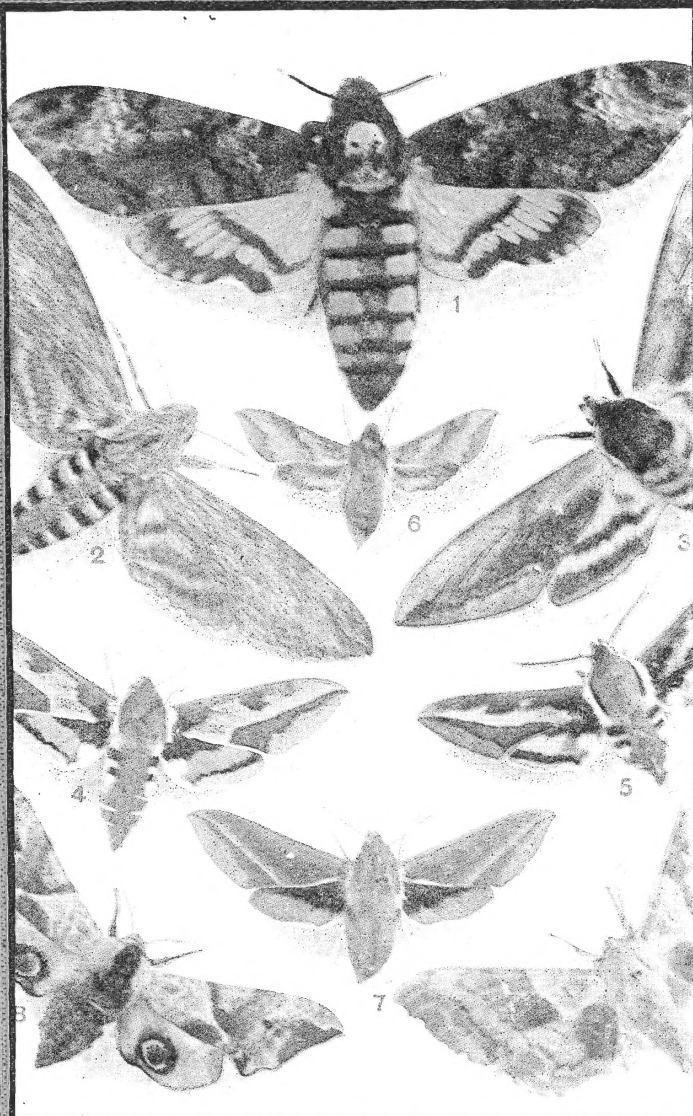


COMMON BRITISH MOTHS



PEEPS AT NATURE

2/-





PEEPS AT NATURE

EDITED BY

THE REV. CHARLES A. HALL, F.R.M.S.

Johnes Clarendon

IX. COMMON BRITISH MOTHS

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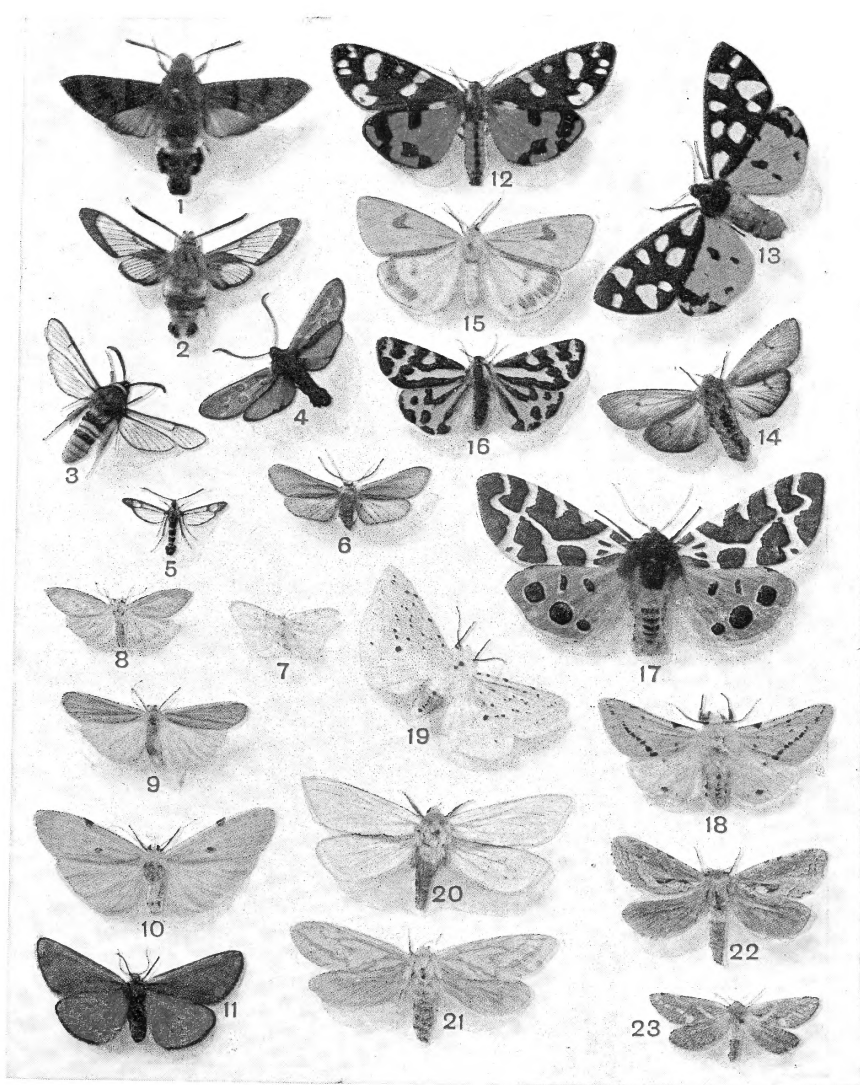
BRITISH REPTILES AND AMPHIBIANS

COMMON BRITISH BEETLES

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PLATE 1.



- | | | | |
|----------------------------|-----------------------|--------------------------|------------------------------|
| 1 <i>M. stellatarum</i> | 7 <i>N. mundana</i> | 13 <i>A. villica</i> | 19 <i>S. menthastris</i> |
| 2 <i>M. fuciformis</i> | 8 <i>C. miniata</i> | 14 <i>S. fuliginosa</i> | 20 <i>H. humuli</i> |
| 3 <i>T. crabroniformis</i> | 9 <i>Z. lurideola</i> | 15 <i>N. russula</i> | 21 <i>H. humuli</i> (female) |
| 4 <i>Z. filipendulae</i> | 10 <i>G. quadra</i> | 16 <i>N. plantaginis</i> | 22 <i>H. velleda</i> |
| 5 <i>S. tipuliformis</i> | 11 <i>E. jacobae</i> | 17 <i>A. caia</i> | 23 <i>H. hectus</i> |
| 6 <i>I. globularia</i> | 12 <i>C. dominula</i> | 18 <i>S. lubricipeda</i> | |



COMMON BRITISH MOTHS

BY

A. M. STEWART

AUTHOR OF "BRITISH BUTTERFLIES"

CONTAINING 18 ILLUSTRATIONS, VIZ.:

8 FULL-PAGE IN COLOUR

8 IN BLACK AND WHITE FROM PHOTOGRAPHS

2 DRAWINGS IN THE TEXT

A. & C. BLACK, LTD.

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INTRODUCTORY NOTE

READERS of the present author's "British Butterflies" in the Peeps at Nature Series will, I am confident, be pleased to have this companion volume on "Moths" by the same experienced entomologist. In commenting on "British Butterflies," the *Entomologists' Monthly Magazine* declares: "We have no hesitation in saying that in point of clearness and brilliancy these coloured figures are the best of the kind that we have seen. . . . Altogether the book may be strongly recommended." I venture to think that the illustrations and text of the present volume merit the same high praise. The exquisite colour plates have been prepared by the three-colour process direct from insects kindly loaned and arranged, in accordance with the author's specification, by Messrs. Watkins and Doncaster, 36, Strand, W.C., to whom we desire here to express our indebtedness. The student must be careful to note that the figures on the colour plates are all three-quarters of the actual size of the moths represented.

The subjects for the photographic plates were arranged with great care by the author from specimens in his own collection, the actual work of photographing being done by the editor.

CHARLES A. HALL.

PAISLEY, 1913.

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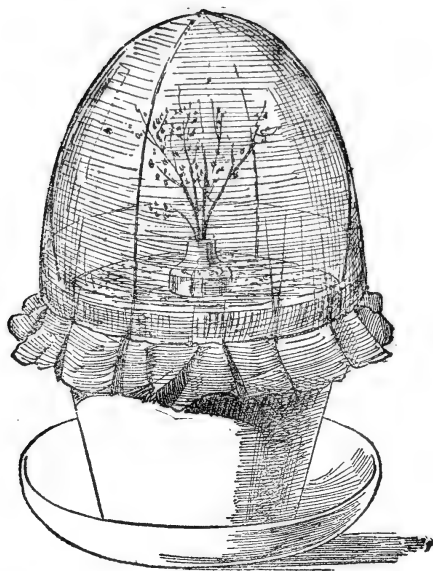


FIG. 1.—AN EASILY MADE BREEDING CAGE.

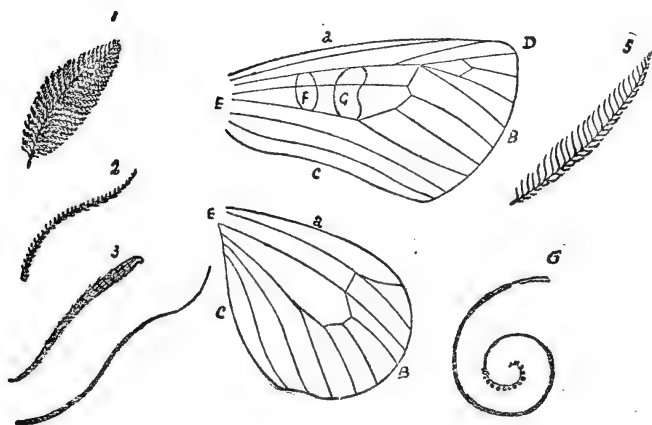


FIG. 2.

VARIOUS FORMS OF ANTENNÆ.

1. Plumose.
2. Ciliated.
3. Fusiform.
4. Simple, or filiform.
5. Pectinated.
6. Tongue of a moth. Note the suckers at the tip.

VARIOUS PORTIONS OF THE WINGS REFERRED TO IN THE TEXT.

- a*, Costal margin.
B, Hind margin.
C, Inner margin.
D, Tip. *E*, Base.
F, Orbicular stigma.
G, Reniform stigma.

COMMON BRITISH MOTHS

CHAPTER I

INTRODUCTION—HINTS ON REARING LARVÆ— SEARCHING FOR PUPÆ

THE life-histories and physical characteristics of butterflies and moths indicate that they are both members of the same great order of Insects, the *Lepidoptera* (Greek, *lepis*, a scale ; *pteron*, a wing), their wings being covered with fine scales. As has been stated in my "British Butterflies," in the "Peeps at Nature" series, butterflies may be distinguished as day-flyers, whereas the moths usually fly by night. The main physical difference between the two sections of the *Lepidoptera* is discoverable in the forms of their antennæ, or horns ; in the butterflies these are club-shaped at their extreme ends, whereas in the moths they show much diversity of form. Both butterflies and moths have the same use in Nature : on the one hand, their larvæ restrict vegetation by eating it ; on the other hand, the insects help to insure its continuance by transmitting the fertilizing pollen from flower to flower, much in the same manner as the bees. If at times some of the *Lepidoptera*, by becoming too abundant and destructive, call for suppression, others, such as the silk-producing moths, merit our esteem for the great quantities of silk they spin.

Introduction

That many a fine career in entomology is commenced with the study of butterflies is not to be wondered at ; the reason is obvious enough. But long before the last species of our short list of native butterflies has been placed in the beginner's collection, the moths will have claimed his attention. At first the novice will be astonished to find how brilliant and beautiful many of the moths are, and that they challenge the form and colour displayed by the finest butterflies ; moreover, he will discover what will please him more : he has now got "a longer row to hoe," for, whereas the total species of British butterflies number about sixty-five, the moths number several thousands. To avoid repetition, we assume that the young collector already possesses "British Butterflies," wherein he will find a description of nearly all the apparatus and methods employed in the collection and preservation of both butterflies and moths. Several matters concerning moths alone—their rearing from ova, time and place of appearing, and special methods of capture—will be dealt with in the following pages.

The study of the life-history of any animal is a work of absorbing interest, and this is particularly true in relation to the insect world. Many insects perform such marvellous feats, display such an uncanny appearance of intelligence, and at times such an utter stupidity, that "you never can tell" where your inquiries may lead to or what grand discoveries you may make. The greatest charm, indeed, lies in the unexpected.

“Sleeving”

In rearing insects from their ova we learn much concerning their habits, and the nearer to their natural conditions we can treat them, the more true to life will all their actions be. By doing this we greatly increase our chance of bringing our labours to a successful issue, and a well-filled notebook and a long row of perfect specimens are surely worth some time and trouble.

They who live in the country, or even possess a town garden, have an immense advantage in the rearing of *Lepidoptera*. They can grow the food-plants, and enclose the larvæ on them as they grow, thus, perhaps, getting as near to natural conditions as is possible, and still keeping the insects under observation.

This process is known as “sleeving,” and it may be described as enclosing a branch or arm of a tree whereon the caterpillars are feeding inside a fine muslin sleeve. This serves a double purpose: it protects the larvæ from sparrows, ichneumons, and other enemies; and they have always an abundance of fresh food and air. As the time for entering into the pupa state approaches either of two plans may be adopted (that is, supposing that the larvæ belong to a species which pupates under the surface of the soil): they can be removed to a regular breeding-cage, the bottom of which is covered to a depth of two or three inches with sand and moss; or one may introduce a solid bundle of damp moss into the “sleeve,” and as the larvæ arrive at maturity they will enter it and find a suitable place in its darkest recesses. When all are settled in the moss, the bundle can be removed for the hatching out.

Hints on Rearing Larvæ

The choice of a branch for "sleeving" is of some importance. Do not have one exposed to too much strong sunshine; rather, select one with a north aspect and fairly well sheltered from rain, if possible.

There are occasionally some difficulties in obtaining ova and starting the young larvæ on their career. Females may refuse to deposit eggs, and young larvæ may refuse to eat, the reason not always being clear. But given natural conditions these obstacles to success soon disappear. Success is most surely secured on the "growing-plant" system, which can be illustrated by a proven example. Suppose we have been fortunate enough to capture one or two females of *Larentia salicata*; the food-plant will not be far from the place of capture. In this instance the plant is all around and abundant—the common little White Bedstraw (*Galium saxatile*). Dig up enough good roots to stock a 7-inch flower-pot. Use plenty of clean sand for potting, press the roots well in, and fill the pot to within an inch of the top; water well; cross two pieces of soft wire (as shown in Fig. 1, p. viii) over the top, these being firmly bound together where they cross, and the ends pushed down into the soil; cover, as indicated in the figure, with fine dark green or black chiffon. This material is so fine and transparent that observations can be easily made through it. The whole operation need not occupy many minutes. Now give the females their liberty under this covering, and a plentiful supply of ova should result. These will be dotted, singly and in little groups, all over the Bedstraw. Stand the pot in

Rearing Larvæ

a saucer, which must be kept filled with water for the benefit of the plants, so that they may be kept fresh and growing without the necessity for disturbing the covering in any way. In from ten to twelve days the eggs will hatch, and the young grubs will start feeding forthwith. The pot should not stand in bright sunshine ; a north light is best. Should the brood be a fairly large one, and the food-plant show signs of inadequacy, introduce some fresh Bedstraw in bottles ; small ink or Bovril bottles are just the right size, and hold sufficient water to last the plant until it is all consumed. The larvæ will now "feed up" rapidly ; in three weeks they will have commenced to pupate, and after a lapse of another four weeks the moths should be emerging. The eggs laid in May should produce the perfect insect towards the end of July. This is the second brood. Only a very limited number of moths are thus double-brooded. With slight variations to suit particular species, the method here sketched has been found by the writer to be a very successful one.

If it is not possible or convenient to grow the food plant in a pot—say, for instance, the species we desire to rear is a Pine feeder—fill the pot with damp sand having a good-sized bottle buried in it nearly up to the mouth. Fill the bottle with water ; put some good fresh Pine twigs into it, taking care to leave no space whereby the young larvæ can enter the bottle and thus get drowned. Pine twigs will keep fresh a long time if the water in the bottle does not get exhausted.

Regular breeding-cages for the larger moths can be

Hints on Rearing Larvæ

either made or bought from the dealers. They need not be elaborate, but they must be kept clean and well aired. At least once a day go over the food-supply, remove all withered or decayed leaves, and sweep out all the "frass." If this rule is rigidly followed, failure to rear the larvæ safely will seldom occur. Coconut fibre mixed with sand forms an ideal medium for larvæ to pupate in; it holds moisture without getting mouldy.

But there are many ways of obtaining larvæ besides hatching them from the egg, and perhaps the most popular and efficient is known as "beating." All that is required for this purpose is an old umbrella; patch up any rents or holes that may be in it, cut off the handle level with the spokes when closed, and also the part projecting at the bottom; this reduces the total length to something like 24 inches. Pushed into a cover like those used for fishing-rods, it can be carried strapped on the back when not in use. Its use hardly needs description. Holding the inverted umbrella under bushes and lower branches of large trees, or under overhanging tufts of heather on a hillside, the vegetation above the umbrella is smartly beaten with a stout stick, and the larvæ present will fall into the trap. Suppose you are among some young Birches, with scrub Oak and Pine, confine your attention to the Birch first, and thus you will keep all your Birch-feeding caterpillars by themselves; eventually you can turn your attention to the Oak, and lastly to the Pine. Keeping the various species separate is worth the trouble. In any case, never overcrowd your larvæ in tins; you have only to

Hibernating Larvæ

do it once to see the havoc. Shut up in a tin—even a tin with plenty of air-holes—the larvæ begin to “sweat”; they get wet and uncomfortable, and by the time you reach home most of them will be dead or much the worse for their treatment. A few twigs of the food-plants should be placed in the tins with the larvæ to give them foothold and food until home is reached, when the first care must be to place the specimens in roomier quarters.

The caterpillars of a few species are undoubtedly cannibals, but such are not many; the only instance of cannibalism of which I have had personal experience was in connection with larvæ of the large green *Geometra papilionaria* (Plate XII., Fig. 17), and they were at their worst in their earlier stages, just when it was most difficult to notice anything wrong. But with abundance of room and fresh food this evil can be reduced to a minimum.

But there are other ways of finding larvæ, and getting them in quantity too.

A large number of caterpillars hibernate, but many of them are very small; upon the whole these are difficult to bring successfully through under artificial conditions, and if you have a fair chance of finding them again when the spring is advanced, it is better to leave them until that season in their natural habitat, and secure them when they have started to feed again. I have found caterpillars whose usual food-plants are among low-growing herbage, and even some which ultimately take to trees and bushes, breaking their fast

Hints on Rearing Larvæ

after hibernation on the first blades of grass on a sunny bank or under a hedgerow. The evening is the time to seek for them. Given a mild evening during March or April, a good lamp, and a sharp pair of eyes, a number of caterpillars can be collected from the ends of fresh blades of grass, on which they can be fed for a week or two longer. As the larvæ grow, identification gets easier, and the proper food-plant, as it becomes available in bud and leaf, can be given to them.

Gathering Sallow catkins just after they begin to wither is also a profitable method of larva-collecting. Many young caterpillars find food and shelter inside these catkins, and perhaps in greatest numbers on female catkins, as these adhere longer to the parent bush, and supply more food in the shape of unripe seeds. If a large number of Sallow catkins are collected from various districts and placed into a large airy box for a week or two, then, as the Sallows out of doors burst into leaf, a few twigs bearing leaves are placed in bottles in the box; on examination of the twigs some night—say one hour after dark—if you have been fortunate, they should be seen swarming with caterpillars of various kinds. During the months of June, July, and August, the seed-vessels of all the Campion group of plants (*Dianthus*, *Silene*, *Lychnis*) should be examined for caterpillars, their large calyces affording a snug little home with a larder well filled with seed. When I describe the species illustrated in this volume, I will give further details concerning the “pod-lovers.”

Quite a number of caterpillars pass their whole life

Wood-Boring Caterpillars

underground, living upon various roots and tubers. They are not very easy to rear, neither can one learn a great deal about them, as all their time is spent in hiding. I have bred two or three species successfully on growing plants in large flower-pots. Some of these I will describe later.

Most of the "Clearwings" and sundry other species have wood-boring caterpillars. While some of them are difficult to manage, with care and attention they can nearly all be reared. The real difficulty is to find them, and much patient searching is often needed before their retreat is discovered. Take *T. crabroniformis*, the Hornet Clearwing, as a typical example. The eggs are small, flat, and oval in shape, in colour brown, and are laid on the bark near the base of a Sallow bush or tree about the first week of July. If the stump is an old one, and is the home of a colony of this Clearwing, the fact is revealed by the presence of a number of round holes, almost large enough to admit a lead pencil, scattered here and there. These are the exit holes of past generations, and are of no use to us now, except as signs of the insects' presence at one time. But pupæ are what we want now. The eggs, we have seen, are laid on the outer bark in July; they hatch in a short time, and the little white grubs disappear under the bark. Their work of destruction has begun. During the remainder of this summer and part of the next the larvæ live near the root and just under the bark, and their presence can be detected by the little bundles of brown, sawdust-like refuse which they push

Searching for Pupæ

out through chinks in the bark. But at the end of about sixteen months—just before the second winter—they begin to bore into the wood, and then upwards. By the following June each tunnel will be 18 inches to 2 feet long, and about that distance from the ground. Three to five inches from the extreme end of the tunnel the larva turns aside and cuts a passage to the outer world, leaving the merest skin of bark to conceal the opening (see Plate XI., Fig. 2). It thus provides for its future exit as a moth. This task accomplished, it next stops up the old burrow with chips of wood and frass until it is just level with the bottom of this side-cut. This is evidently done to prevent the pupa from falling down the old shaft, where it would perish.

All being now completed downstairs, the larva moves once again to the top end of the bore, and, turning head downward, starts to spin a loose cocoon, fairly strong, and toughest just under his head, possibly to resist the intrusion of ants or other undesirable enemies. By the middle of June the change will have taken place, and a pupa now occupies the cocoon.

If we find it immediately after this transformation, the pupa will be white and soft, and on no account should an attempt be made to remove it in such a condition. Carefully close up the burrow, and call again in a week or two. By that time the pupa should be a deep orange colour, and hard ; it is then in the most suitable condition for removal. A small tin box packed with damp moss does admirably for carrying the pupæ.

Obviously, in an excursion in search of these pupæ



1. Cocoon of *Bombyx quercus*
2. Larva of *B. quercus*
3. Larva of *Orgyia antiqua*
4. Larva of *Anarta myrtilli*

5. Larva of *Saturnia pavonia*
6. Cocoon of *S. pavonia*
7. Larva of *Noctua festiva*
8. *Ichneumon dentatus* parasitic on
B. quercus larva

Searching for Pupæ

we must first seek Sallow trees or bushes and examine them for the tell-tale empty burrows ; then hunt for the newly-made caps, which are the indications of the presence of the tenants. Some experience and practice will be needed before complete success is attained. Every little inequality or depression on the bark should be tested by the nail and finger-tips ; each discovery makes the next one easier. In dry weather or in an exposed situation I have noticed these little caps to dry up and crackle (as shown in Plate XI., Fig. 2), so that the eye could trace the outline of the circle. In such case one touch of the finger is sufficient to make the withered caps fall off and disclose holes as indicated in Fig. 3 of the afore-mentioned plate.

Remember that the pupa is to be found several inches straight above the hole, and well into the wood. A large and strong pocket-knife may be useful in an emergency, but it is slow at the best, and hard to work in a cramped position and with green wood. The best tool is a joiner's paring chisel 1 inch wide ; any odd rounded stone does for a hammer. Make a few cuts at, say, 6 inches or so above the hole, and gently tear the bark downward towards it ; the wood will be discoloured along the course of the burrow beneath. Take another slice, this time off the wood, and the end of the discoloration will show the termination of the burrow, and, of course, the site of the pupa. A third slice off should lay it bare.

If you look at the pupa for a moment or two before transferring it to your box, you will notice that the

Searching for Pupæ

dorsal half of each abdominal segment is ornamented with a ring of sharp spines. Had you left the creature to hatch naturally, it would have used these spines in effecting its escape from the cocoon, and also in worming its way towards the exit hole. It works in a spiral fashion, twisting round and round, and is, so to speak, just a living screw-nail. Should you have arrived on the scene a day too late, you will find the empty pupa-case sticking halfway out of the hole. Plate XI., Fig. 4, will show you some of these details, and help you to understand this strange and interesting life-history of *T. crabroniformis*.

After larva-hunting comes pupa-digging. It requires some little knowledge of food-plants and seasons—knowledge more easily acquired and more likely to be remembered if learned through experience in the field. Book-lore is well enough in studying Nature, but actual work in the country is the thing that counts in the making of a naturalist. To go out and start pupa-digging anywhere and at any time is to invite failure. Nearly all larvæ have a particular food plant or plants on which they may be seen feeding during certain seasons of the year ; afterwards they disappear. Where? Ofttimes it is very difficult to discover. They have many enemies searching for them during their pupahood—birds, beetles, moles, mice, and ants, all take toll of them—hence the necessity for concealment. Practically helpless, they cannot run away, neither have they any weapons for defence or offence ; so they must hide, in a thick cocoon in some cases, but

Pupa-Digging

somehow they must hide, and because they hide they are hard to find. One may leave a goodly number of caterpillars feeding on a plant, and expect to find the pupæ in due season (say in the surface soil under the plant); but when one comes to search for them, not a single pupa will be found. The larvæ, it would seem, left the vicinity of their food-plants and sought a safe retreat elsewhere in which to pupate. Where is this safe retreat likely to be? The requirements are—Safety from foes that would devour them, floods that would drown them; a site not too wet and cold, nor too dry and hard, where cattle are not likely to tread them under foot—in short, a sheltered, shaded retreat where the soil is moderately loose and moist, say along the foot of a low wall, or round the bottom of a tree-trunk, or under a not too dense hedgerow.

In hunting for pupæ it is well, if possible, to ascertain by examination of food-plants whether caterpillars have been feeding on them. This is not always possible—if, for instance, in the early spring last summer's leaves are all gone, and the plants are barely visible above ground. So pupa-digging is almost always something of a lottery, but by observation and experience many a good haul can be made. One "fail-me-never" is around the feet of Oak-trees—solitary trees for preference, or those skirting the edge of a wood and along a roadside, if the surrounding soil is moderately free, not too hard, tough, and full of grass-roots. Setting out during the early months of the year—say in February and March—by carefully raising

Searching for Pupæ

the loose turf and soil at the feet of the Oaks, and shaking and examining them, you are sure to find some pupæ. You need not dig very deep; two or three inches is enough. Work from the trunk outward. The great bulk of your "take" will likely be members of the *Tæniocampa* genus (*T. Gothica*, *T. stabilis*, etc.). These are easiest to find; indeed, they tumble quite readily out of the turf, as they spin little or no cocoon. As experience increases, so will your haul. Always note carefully the date and situation of any chance find.

Caterpillars, not being reasoning animals, and inheriting a certain tendency of conduct, deviate very little from their prescribed habits; so that, once one gets a clue to the habits of a certain larva, one should follow it up, and very often it will lead to the solution of what has been long a mystery.

Pupæ are frequently found on tree-trunks under patches of moss, and they should be looked for there at all seasons, but especially in spring. Such as I have found beneath the moss have been stowed away in cracks and fissures, so that merely stripping off the moss did not cause them to fall out, which shows that we should search all the little holes and corners and under loose bits of bark. Large numbers of the "small fry" (the *Tortrices* and *Tineæ*) pupate on or amongst the leaves of plants on which they fed, generally drawing them round themselves with silken threads. Others, again, live in little colonies under a web on the flower-heads of some of the larger umbelliferous plants, and when they are about to pupate they descend the stalk of the



1. Larva of *Lasiocampa quercifolia*
2. Larva of *Notodonta dromedarius*
3. Larva of *Dicranura vinula*
- 3A. Cocoon of *D. vinula*
4. Larva of *Dasychira pudibunda*
5. Larva of *Phalera bucephala*

The Collector at Work

plant until they arrive at the first or second axil (that is, where a leaf breaks off from the main stem) ; here they bore a hole into the hollow stalk, and, climbing up a good way from the entrance, spin a few threads and await their change. Their fellows follow the same route, and in many instances utilize the same entrance, so that, on splitting the stalk, I have often found a long row of pupæ and only one entrance hole. These little holes prove useful later on in quite another way. In the depth of winter one may find these large hollow stems of the Umbelliferæ standing, bleached, dry, and hard, stoutly defying the winter's blast. If they are carefully cut and carried home, and there split over a sheet of white paper or linen, we can realize what a world of creatures find a safe retreat in these friendly tubes. Earwigs, ichneumon and other flies, hibernating larvæ, spiders, small snails, beetles, are there discovered in a dormant or semi-dormant state.

A small weeding fork is a very handy tool for pupa-digging in the spring or winter months.

CHAPTER II

THE COLLECTOR AT WORK

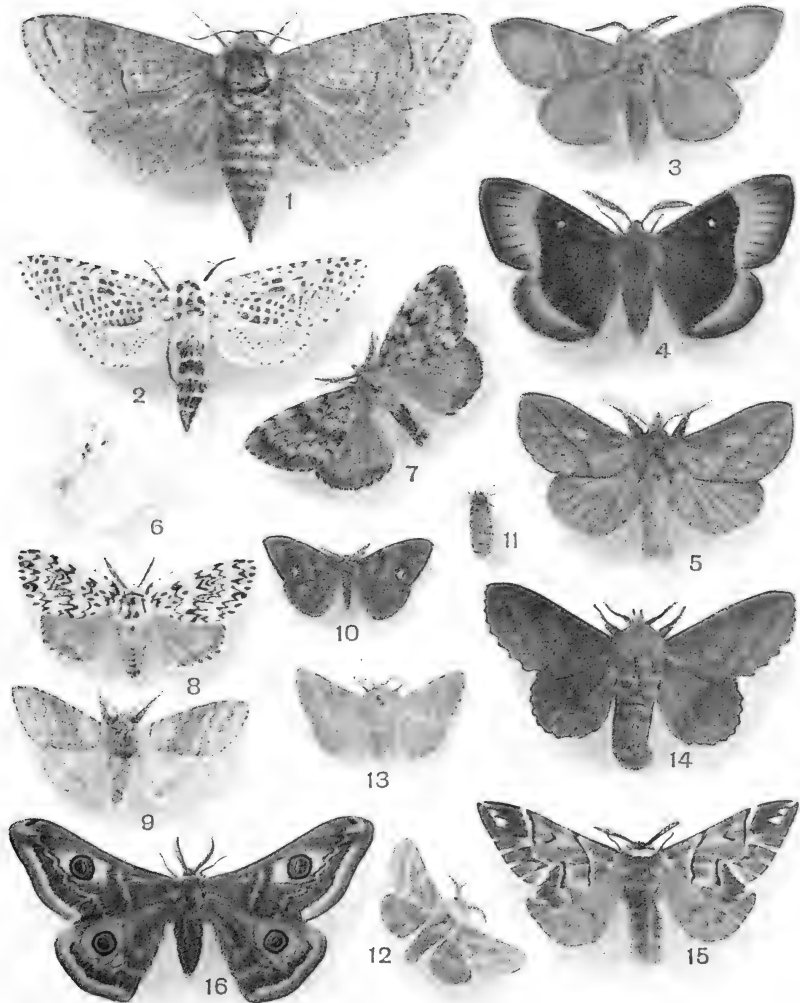
"The midges dance abune the burn,
The dew begins tae fa' ;
The patricks doon the rushy holm
Set up their e'enin' ca'."

ON a June evening, long before sundown, we are footing it along a dusty highway. After some miles of

The Collector at Work

walking, we leave the broad road for less frequented by-paths, and by-and-by find ourselves on a footpath skirting the edge of some damp meadowland. Beyond us lies a pine-wood, flanked by a heathery moor with great patches of bracken and clumps of birch. We expected to arrive here about 9 p.m., but are half an hour early ; yet it does not look as if there will be any waiting to-night, for already the "Northern Swift," *H. velleda*, is on the wing, making his way in and out of the bracken. This moth leads the collector a merry dance if one tries to run him down with the net. He frequents this path by the edge of the bracken, and here finds scope for a long, straight flight ; he gets up steam, and shoots along full of the joy, and also the business, of life. He is searching for a partner now ; indeed, we too have been scouting for the lady *Velleda* since the flight commenced. In a few minutes we are rewarded ; we observe a sudden gathering of the clan round a tuft of long grass, and immediately our net is busy snapping up the males as they arrive. This gathering of the males lasts but a minute or two. We know there is a female hidden somewhere near, and that she is the cause of this sudden concentration of the males, of which, working rapidly, we have boxed a dozen without leaving the spot. The run ceases as suddenly as it began, and, stooping down, we soon find lady *Velleda* and her partner. In a few more minutes the flight of this species is over for the night. The short duration of the evening flights of moths is very remarkable : some species take wing early, some late ; but the aver-

PLATE 4.



1 *C. ligniperda*
 2 *Z. pyrina*
 3 *B. rubi*
 4 *B. quercus*

5 *O. potatoria*
 6 *P. similis*
 7 *O. dispar*
 8 *P. monacha*

9 *D. pudibonda*
 10 *O. antiqua*
 11 *O. antiqua* (female,
 12 *B. castrensis*

13 *B. neustria*
 14 *L. quercifolia*
 15 *E. versicolor*
 16 *S. pavonia* (male)

A Raid for Moths

age time from the appearing of the first specimen until the last has gone to rest is about twenty minutes. *Velleda* is content with less time.

Here I may pause to explain. We are out on a raid for moths, and have arranged our plan of campaign to suit the various times and places where we know, from past experience, we are likely to meet with success. Our equipment is simple ; we carry an ordinary collecting net as described in "British Butterflies," a large vasculum filled with nested pill-boxes, a pocket-lamp, and a tin of "sugar"—a $\frac{1}{4}$ -pound cocoa-tin filled with *cane* treacle to which have been added a tablespoonful of honey and a teaspoonful of rum. We have a small coarse brush with which to apply this mixture to tree trunks, an operation which I shall describe presently. Our pockets are large and plentiful. Our rule is to fill the right and left outer jacket pockets with *unnested* boxes of various sizes, and, as these are filled, to put them with their contents into the inner skirt pockets ; then as the boxes are used we apply to the vasculum on the back for more. We carry upwards of 200 boxes.

The flight of *Velleda* being over, we cross to the softer meadowland to get amongst the Yellow-Rattle (*Rhinanthus Crista-galli*). The Grass Rivulet (*E. albulata*) is everywhere, and soon we have a few fluttering in the net; selecting the best, and rejecting damaged insects, within ten minutes we have a score of picked specimens. But we are after rarer game; *E. plumbeolata* and *E. pygmæata* both occur here, the former fairly commonly, the latter is rarer, and, on

The Collector at Work

account of their sombre colouring, neither of these species is so easy to bag as *Albulata*. By the time we have secured a few, a *Noctua* dashes past, and reminds us of the flight of time. Ten o'clock! It is now time for "sugaring." A few strides bring us to the corner of the wood, and "sugaring" begins. Selecting the trees along the southern and eastern sides of the wood, by the time the contents of the tin are exhausted about sixty trees carry a perpendicular stripe of treacle, breast-high, 2 inches wide and 10 inches long. We throw the tin away, wrap the brush in several coverings of paper, wipe our hands on the dewy grass, and are ready for the next move. How quiet the woods have grown! Half an hour ago rabbits and pheasants were stealing into the open for their evening meal: the rabbits are now lost in the dusk; the pheasants have returned, not without some noise, to roost in the trees. An owl flits past on silent wing. Many moths are still abroad, but the net is practically useless; these sombre-coloured, swift-flying *Noctuæ*, are all but invisible to our eyes unless seen against the background of the luminous western sky. There, high up, coming and going, circling and zigzagging to and fro about the pine-tree tops, we can just discern little companies of them, and dimly guess at the probable species. We have learned that these *Noctuæ* fly far beyond our reach—hence the "sugar." And so we get out our lamp and light it. It is not much of a lamp, for particular reasons. All that is needed is sufficient light to box by, and not enough to scare any living creature. We

“Sugaring”

hold our permission to visit these woods on the condition of not disturbing the game. We move quietly with our small light, and never a creature moves ; when we speak it is in a whisper ; the silence of the night and the darkness under the trees assert their wonderful influence over us, and we, too, are quiet and wholly absorbed in our quest.

Gliding silently from tree to tree, one carries the lamp while the other attends to the net and boxes. On approaching a tree, the net is held under the sugar patch, the light is turned on, and many insects fall into the net, to be attended to after ; we must first see what moths are busy with the sugar. Plenty of common species are regaling themselves, but here is a prize, and there is another ! Proceeding carefully, an open box is held under the victim ; he is given a touch with the lid, and he falls in ; the rum has proved too much for him ! These moths are careful not to approach too near the feast ; they seem to have a horror of sticky feet. Always alighting a short distance from the treacle, they approach carefully, and once they get within range they extend their long suckers, and sit with only the extreme tips of their tongues in contact with the sugar. Observe their eyes ; they are ruby red and glowing ; they gleam in the dark like tiny jewels. All the way down the trunk where a trickle of the sugar has run we find moths, and more moths ; and here is a large black and violet beetle (*C. catenulatus*), his mandibles buried in a luscious drop. Spiders and centipedes come forth from the crevices in the bark and join in the revel ; a large grey

The Collector at Work

slug has left its home in the damp grass at the base of this tree, and, with horns extended, is slowly moving upwards, wondering, no doubt, in his dull way, how it comes to be raining honey, and if he will reach it in time to get a share. We visit tree after tree, going twice over the ground and selecting our specimens; our boxes are now all filled, and what a night we have had! It is now well past midnight; we have been too absorbed to notice the flight of time. But we walk four miles home light-heartedly, for our boxes are full.

From early spring till late in the autumn, never neglect the rural street lamps; and if their light be incandescent or electric, so much the better: many moths will come to light, and play round a lamp, for whom "sugar" has no attractions. This is particularly noticeable with the *Bombyces* and *Geometræ*. It is pretty certain that quite a number of these moths dine very sparingly, if ever. Where and how they obtain a repast is not known, but it is generally supposed that they have a sufficient store of reserve nutriment within themselves—a reserve stored during their caterpillar days—which is drawn upon and used up during their short existence as moths. Certainly they are born from the chrysalis plump and well nourished, and in a few days they die mere skin and feather.

For capturing moths that are drawn to lamps it is necessary to have an extra long handle for the net. A handful of boxes and certain coins of the realm, bestowed upon the custodian who turns out the lights in the early

Flower-Visiting Moths

morning have been known to secure many a valuable specimen. Many trap lamps have been invented for carrying into the country ; but, given an empty room in a country house, a good light, and a large open window, almost every night, but especially during spring and autumn, many moths will find their way to the light and be easily secured. I do not recommend burning the light all night ; moths fly from dusk till an hour or two after dark, and again at dawn ; between these two periods of activity there is an interval of rest for moths as well as for men.

At dusk many moths visit flowers, and experience will dictate how best to net them. The suburban garden, if planted with a fair quantity and a good succession of certain kinds of flowers, can be made into an excellent hunting-ground. Bees visit flowers for pollen and honey, moths for honey only. Certain flowers that can be entered by bees are inaccessible to moths ; the former are not daunted by a flower with a constricted entrance, but the latter require blooms with wide mouths that do not bar the way. The most suitable flowers to grow for the attraction of moths are the small " Turn-Cap " or " Turk's-Cap " Lilies, Sweet-William, Rose-Bay Willow-Herb (*Epilobium angustifolium*), Delphiniums, Verbena, Petunias, etc. : these I have found very attractive.

When hunting for flower-visiting moths in the country, they are most likely to be found about clumps or masses of bloom. Ragged-Robin (*Lychnis flos-cuculi*) is almost sure to be visited by many species at sun-

The Collector at Work

down, and among other favoured flowers mention may be made of Thistles, Wood-Sage, Bramble, Hedge-Woundwort, Honeysuckle, Heather, and all species of the Campion family.

It will be observed that moths in feeding at flowers do not rest on the bloom ; neither do their wings cease vibrating during the operation. They steady themselves for an instant in front of the flowers by means of their fore-legs, and at the same time the proboscis, or tongue, is thrust into the nectaries. Being always on the wing, the moths lose no time in going from flower to flower. But this peculiarity renders their capture at times rather difficult. In netting insects at bloom, it is necessary to advance slowly, almost stealthily, and avoid jerky movements. Of course, in a garden one must not destroy the flowers by slashing at them with a net, nor is there any need for damaging a single bloom. Take a typical case. We are watching a clump of "Turn-Cap" Lilies, and a moth suddenly appears under a bell. The flight was so swift that we could not see from whence the insect came, but there it is; it might be taken with an upward stroke of the net, but we should also net half a dozen blooms, and very likely break the spike. The proper way to take the moth is to advance your net slowly and low down, holding its tail between the finger and thumb of the left hand, until you have the net right or almost under the insect. Now tip the spike away from the moth by a rapid side-tap, and at the same time make an upward stroke with the net. The insect is for an instant in mid-air, and after your

Flower-Visiting Moths

net passes on the flower-spike swings back into its place, without a bell disturbed, and the surprised victim is fluttering in the net.

In the spring, when the Sallows are in bloom, a rare feast is provided for all the insect world. What a harrying these fuzzy-looking flowers get! bees and other flies haunt them during every hour of sunshine, while moths positively swarm over them after dark. The bees sip their fill and go their way, invigorated no doubt by the first square meal of the season; but the moths, alack! the degenerate crew! they stay on and tiddle, tiddle, until they can no longer fly. Spread a white sheet or hold an inverted umbrella under a bush, and a shake brings down the whole helpless crowd, and they lie sprawling, an easy prey to the entomologist. Their stupor soon clears away. Occasionally autumn moths which have passed the winter in hibernation will be found at the Sallows; they are generally useful if eggs are wanted, but are hardly suitable as specimens for the cabinet.

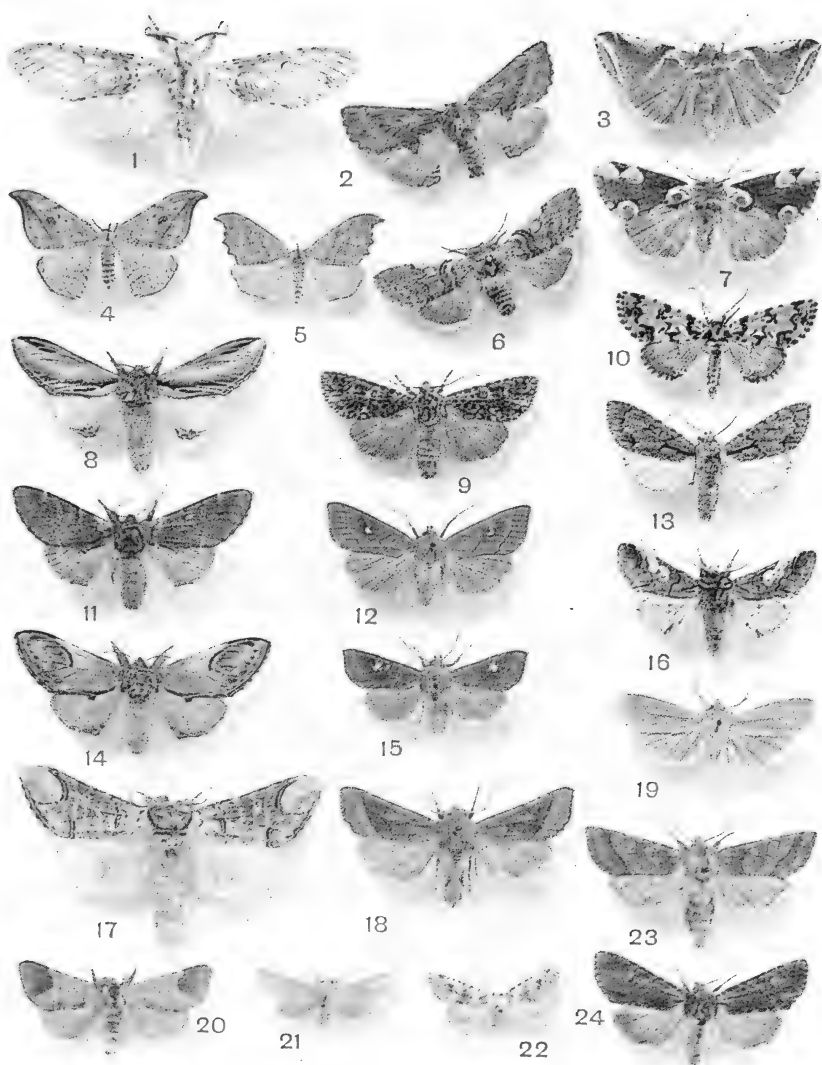
Later in the season the flowers of the Ragwort (*Senecio Jacobæa*) have great attractions for many moths; especially is this the case among sand-hills on the coast, and it is curious to observe that this plant also has a distinctly narcotic effect on its insect visitors. Turning the lamp suddenly on to a large patch of Ragwort, many *Noctuæ* will be observed busily at work, and one by one, before you have time to examine a fraction of them they will loose their hold and roll down among the grass, where it is almost hopeless to look for them.

The Collector at Work

So I have found it not a bad plan to shake the large flower-heads of the Ragwort over the open net—everything will fall in—*then* turn on the lamp. Thus nothing is lost—not even earwigs and other undesirables.

Beautiful examples of the value of protective colouring are common amongst the moths. The reason for it is apparent. Moths rest during the day, just when their enemies are most active. They must either conceal themselves in dark corners, or so blend with their surroundings in the open that their detection is a matter of great difficulty. During the summer, rocks, walls, and tree-trunks, are the favoured resting-places of a regular succession of species. On the granite boulders of a rough hillside where Heather and Whortleberry abound, these moths may be found resting in dozens. They evidently find it safer there than in the Heather, which, truth to tell, is generally well stocked with lurking spiders. Moth-collecting under these circumstances is something of a fine art. The pearly grey and gold of lichen, the weather-beaten mosaic of the granite, and the pattern on the moth's wing, all blend in such a harmony of colour that even the most experienced eye often fails to locate the prize it is searching for. But what the eye fails to detect a puff of the net will reveal, and many an alarmed insect, which would have lived to tell the tale had it sat tight and trusted to its disguise, is captured by the crafty collector.

There are few places, from the summits of our highest mountains to the bottom of a mine, where moths of some kind may not be found.



- | | | | |
|--------------------------|--------------------------|-----------------------------|-----------------------|
| 1 <i>D. vinula</i> | 7 <i>T. batis</i> | 13 <i>A. psi</i> | 19 <i>I. impura</i> |
| 2 <i>I. camolina</i> | 8 <i>N. dictæa</i> | 14 <i>N. ziczac</i> | 20 <i>P. curta</i> |
| 3 <i>T. derasa</i> | 9 <i>A. rumicis</i> | 15 <i>H. nictitans</i> | 21 <i>T. fulva</i> |
| 4 <i>D. falcataria</i> | 10 <i>M. Orion</i> | 16 <i>D. cæruleocephala</i> | 22 <i>B. perla</i> |
| 5 <i>D. lacertinaria</i> | 11 <i>N. dromedarius</i> | 17 <i>P. bucephala</i> | 23 <i>A. ochracea</i> |
| 6 <i>A. flavicornis</i> | 12 <i>L. conigera</i> | 18 <i>H. micacea</i> | 24 <i>X. rurea</i> |

Moths in a Mine

It is many years since I first made the acquaintance of what the miners called the "butterflies" in the pit. When I first heard their story, I took it with the proverbial grain of salt; but on being assured that the story was true, curiosity got the better of discretion, and, after some *pourparlers*, it was arranged that I should go down the mine on a Sunday morning and see the "butterflies" myself. My guide was the "pony boy," whose duty it was to attend and feed the ponies on Sundays. We met near the pit-head on a lovely morning in March. A friend accompanied us, so we were a party of three. The engine-keeper supplied us with lamps—ordinary colliers' naked lights—for it was an ironstone mine free from gas. Our quest of the "butterflies," one could see, tickled the old engine-keeper; perhaps I imagined a twinkle in his eye that suggested a nice joke at somebody's expense.

In due time we were lowered into the mine and conducted to the stables, which in mines are practically caves cut into the solid rock. I was told that the "butterflies" were attracted by the miners' lights; and they were there sure enough—not butterflies, which, of course, I did not expect to find, but moths fluttering along the "roof," which was but a few inches above our heads. We did not need to use a net, and in a minute a specimen was in a box; it proved to be a fine, normally-developed specimen of the Hay Moth (*C. quadripunctata*—Plate VIII., Fig. 10). There were plenty of the moths, and, from what I could learn, they were to be found in the mine nearly all the year round,

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a fact due, probably, to the fairly high and steady temperature. Their presence was not difficult to account for: hay is the food of the larvæ, and there was hay in abundance in the stables; doubtless the eggs of the insect had been transferred to the mine with the hay. In such a retreat the larvæ would not have to reckon with enemies like sparrows and ichneumon flies. We also found two or three specimens of *Tineæ* which came from the beams of the stables.

The method of setting and preserving moths is the same as that followed in dealing with butterflies, and as the subject is treated of in "British Butterflies" of this series we must refer the student to it for details. But the method employed in killing moths is quite different. Moths are, or should be, all boxed in separate pill-boxes on the scene of action—one moth, one box, which must not be too small. Nested chip, cardboard, or the dearer and stronger boxes styled "shouldered," are all about equally popular. The scarlet cardboard boxes can be made more lasting by strengthening the bottoms and lids with brown paper stuck on with glue. It is a good plan to carry a few glass-topped boxes on all occasions. Females or doubtful specimens can be leisurely and correctly examined through the glass, and either retained or liberated as one decides. These boxes can be obtained at moderate cost from dealers.

It is essential that the moths should not be allowed to remain fluttering in the confinement of the boxes any longer than necessary, otherwise they will become rubbed and spoiled for cabinet purposes. And, as we



1. Larva of *Endromis versicolor*
 1A. Pupa of *E. versicolor*
 2. Larva of *Porthesia similis*
 3. Larva of *Bombyx rubi*

4. Larva of *Eriogaster lanestris*
 5. Larva of *Bombyx Neustria*
 5A. Cocoon of *B. Neustria*
 6. Larva of *Ocneria dispar*

Killing Moths

must kill them if we are to have specimens at all, it is our duty to do so as swiftly and painlessly as possible. As a killing agent, strong solution of ammonia ($\cdot880$) is ideal for nearly all species, *excepting the more brightly coloured ones, and it must never be used for green moths.* Be certain that the ammonia solution is of full strength. A large, wide-mouthed, glass-stoppered confectionery bottle makes a good lethal chamber. Having made a few pinholes in each pill-box containing an insect, all the boxes are placed in the bottle, a piece of blotting-paper soaked with the ammonia is also inserted, and the bottle is at once closed with the stopper, which should fit securely and not allow the fumes to leak out. If this is done at night when you arrive home with your captives, in the morning they will be ready for setting. Chloroform is sometimes used as a killing agent; but while it does not injure the colours in any way, it leaves the insects very stiff, and for some time after death they are difficult to set, and not infrequently I have had specimens, supposed to have been killed with chloroform, revive after setting. Nevertheless, chloroform is a safe agent to use for the more delicate and the green and brightly-coloured moths.

Bruised laurel leaves give off fumes which kill moths in a satisfactory manner. The fresh leaves should be placed in the bottom of a wide-mouthed bottle and well pounded. After being bruised they should be covered with a piece of blotting-paper or muslin. A laurel jar thus prepared kills quickly and cleanly; it is unequalled for casual specimens and such as are being hatched in-

The Collector at Work

doors. But it is not advisable to carry it into the field and tumble unboxed insects into it, as I once saw a collector do ; needless to say, by the time he reached home his specimens were all rubbed, frayed, and useless.

It is of paramount importance that the worker should furnish himself with a notebook, not only for recording excursions and captures, but the many details of insect life which are learned by the seeing eye and are noted by studious observation. Such a book will in time become a treasured possession, a storehouse filled with useful and interesting facts purchased with hard experience. In later years it will conjure up recollections of many pleasant times spent in the woods and fields.

CHAPTER III

SOME BRITISH MOTHS DESCRIBED

BEFORE describing the species of moths which are figured on the plates of this volume, I would draw attention to the drawing (Fig. 2, p. viii) of the right fore and hind wings of an imaginary moth, with particular reference to the nervures. These nervures vary greatly in the different families of moths, and some entomologists have devised complete classifications on the neururation of the wings. The student should learn the terms applied to the main structural details of the wings as indicated in the figure, so as to be able to follow the text intelligently, and identify correctly any specimens that may come to hand. There are occasions when it is necessary to examine minute

Some British Moths Described

organs, in addition to the wings, in order to determine a species. Such examination demands the use of a microscope, and is undertaken by the specialist, so I do not explain it here.

The classification and nomenclature used in the following descriptions are those which appear in South's "Synonymic List of British Lepidoptera." It can be obtained in the form either of a reference and exchange list, or printed on one side of the paper only for labelling the collection. The English names given are those in general use. Let it be noted that all the figures on the coloured plates are three-quarters natural size.

NATURAL ORDER LEPIDOPTERA,

SUBORDER HETEROCERA (MOTHS).

SPHINGES.—Family SPHINGIDÆ (HAWK MOTHS).

Acherontia atropos: the Death's-head Hawk-Moth (Plate XVI., Fig. 1).—This is the largest British moth. Although widely distributed, it can hardly be said to be common. The insect derives its common name from the skull-like mark on the thorax. The usual expanse of the wings is $4\frac{1}{2}$ inches. The caterpillar is green or brown, with lighter diagonal stripes, and it has the short tail characteristic of its family. It feeds on Potato leaves. The moth appears in autumn. It is able to make a squeaking noise when irritated. It is attracted by light, but not by flowers.

Sphinx convolvuli: the Convolvulus Hawk-Moth (Plate XVI., Fig. 2).—Commoner than the last, and

Some British Moths Described

visits flowers, from which it sucks nectar while hovering on the wing. Widely distributed, but more frequent in the South of England. Caterpillar generally two shades of brown, with lighter oblique stripes and the usual little tail. The pupa is furnished with a curious sheath for the proboscis. The moth appears in the late autumn. Wing expanse, about $4\frac{1}{2}$ inches.

Sphinx ligustri: the Privet Hawk-Moth (Plate XVI., Fig. 3).—The commonest of the genus. The larva feeds on Privet and other garden trees. It is green, with diagonal white stripes on the sides, and the thorn-like tail is well developed. Perfect insect appears in June. Wing expanse, $4\frac{1}{4}$ inches.

Deilephila euphorbiæ: the Spurge Hawk - Moth (Plate XVI., Fig. 4).—A rare species. The best way to obtain specimens is to search for larvæ from July to September and rear them. The larva feeds on Spurge, principally on the South Coast of England, but it has been noted as far north as the coast of Ayrshire. The moth appears about June. Expanse, $2\frac{1}{2}$ inches.

Deilephila galii: the Bedstraw Hawk - Moth (Plate XVI., Fig. 5).—Although this moth is not commonly seen on the wing, the larva is frequently found on the southern seacoast feeding on Bedstraw or Willow-Herb in summer and autumn. Perfect insect appears in June and July. Expanse of wings, about $2\frac{1}{2}$ inches.

Chærocampa porcellus: the Small Elephant Hawk-Moth (Plate XVI., Fig. 6).—Expanse of wings, 2 inches. Widely distributed as far north as the middle



1. Larva of *Hadena psi*
2. Cocoon and empty pupa-case
of *Zygæna filipendulæ*
3. Larva of *Z. filipendulæ*
4. Cocoon of *Odonestis potatoria*

5. Larva of *O. potatoria*
6. Larva of *Triphæna comes*
7. Larva of *Noctua augur*
8. Larva of *Triphæna pronuba*

Some British Moths Described

of Scotland. Comes to flowers at dusk during June and July. Larva on Bedstraw in autumn. It has no tail.

Chærocampa elpenor: the Large Elephant Hawk-Moth (Plate XVI., Fig. 7).—A fairly common species, but local, and to obtain fine specimens it is best to hunt for the larvæ and rear them. They feed on Willow-Herb, both *E. angustifolium* and *E. hirsutum*, and also on Bed-straw, in August and September. The moth appears in May and June, and comes to flowers and light. Expanse of wings, rather under $2\frac{1}{2}$ inches.

Smerinthus ocellatus: the Eyed Hawk - Moth (Plate XVI., Fig. 8).—The only British hawk-moth with eye-like markings. Not uncommon, and is easily reared. The larva feeds in autumn on Sallow, Poplar, and various fruit-trees. By submitting the pupa to a steady artificial heat—say about 70° F.—the perfect insect will emerge in from fourteen to twenty days. All the “hawks” are very susceptible to this treatment, and it avoids any risk through keeping the pupa over the winter. In Nature the moth appears from May to July. Wing expanse, about $3\frac{1}{2}$ inches.

Smerinthus populi: the Poplar Hawk - Moth (Plate XVI., Fig. 9).—Common everywhere in June. Larva green, rough, and with the usual tail. Feeds on Sallow and Poplar during July and August. The moth comes to light. Wing expanse, from 3 to $3\frac{1}{2}$ inches.

Macroglossa stellatarum: the Humming - Bird Hawk-Moth (Plate I., Fig. 1).—Generally frequent, and occasionally common; a well-known migrant, sometimes appearing in swarms; flies boldly by day,

Some British Moths Described

and comes to flowers and light. Larva feeds on Bed-straw. Wing expanse, slightly over $1\frac{1}{2}$ inches.

Macroglossa fuciformis: the Narrow-bordered Bee Hawk-Moth (Plate I., Fig. 2).—Not unlike a large humble-bee, but, needless to say, carries no sting. Visits flowers during the day, and is not uncommon in June. Wing expanse, $1\frac{3}{4}$ inches. Larvæ are found in July and August on Scabious (*Scabiosa succisa*). They are green and tailed.

Family SESIIDÆ.

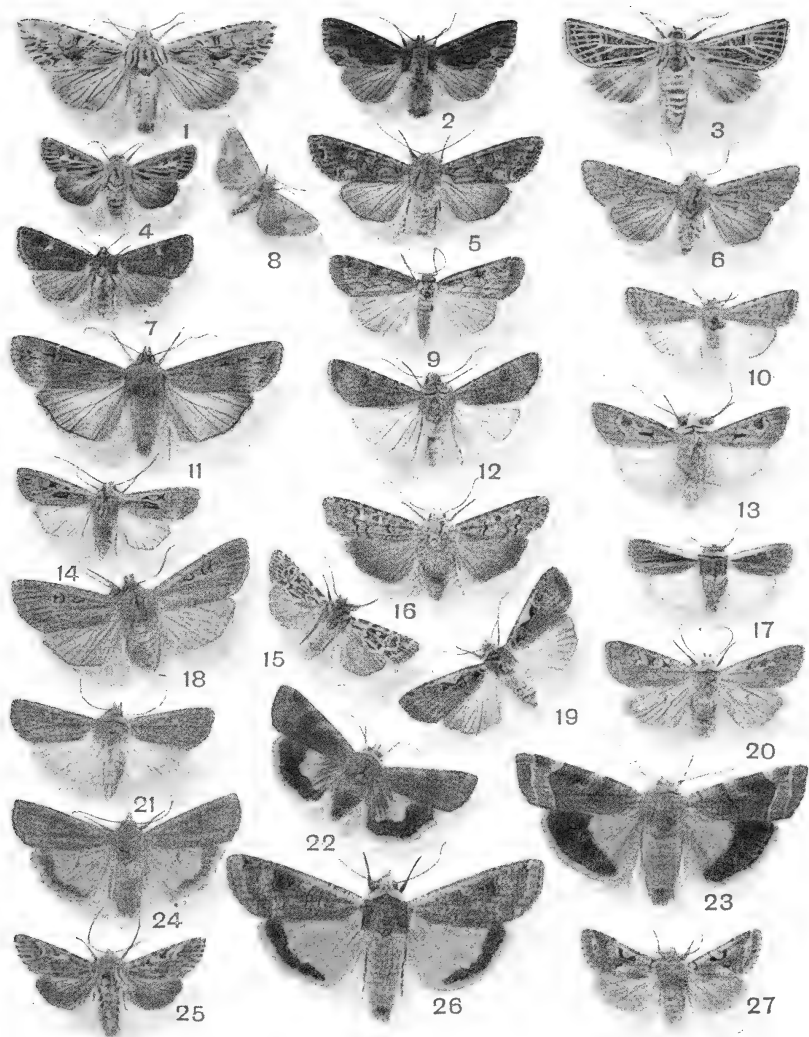
Trochilium crabroniformis: the Hornet Clearwing (Plate I., Fig. 3).—See pp. 9-12 for detailed life-history of this species. The moth appears in July. Wing expanse, $1\frac{1}{4}$ to $1\frac{3}{4}$ inches.

Sesia tipuliformis: the Currant Clearwing (Plate I., Fig. 5).—This is the commonest of our Clearwings. The larva feeds in the twigs of Currant-bushes. It may be looked for in gardens during the winter. The moth comes out in June. Expanse of wings, $\frac{3}{4}$ inch.

Family ZYGÆNIDÆ.

Ino globulariæ: the Scarce Forester (Plate I., Fig. 6).—A local species, confined to the South of England. No illustration can reproduce the bronzy sheen of these little moths. There are two types of coloration—the blue-green and the bronze. The larva feeds on the Greater Knapweed (*Centaurea scabiosa*) in the early summer. Moth appears June and July. Expanse of wings, about 1 inch.

PLATE 8.



- | | | | |
|--------------------------|-----------------------------|---------------------------|------------------------|
| 1 <i>X. monoglypha</i> | 8 <i>M. fascinuncula</i> | 15 <i>A. strigula</i> | 22 <i>T. ianthina</i> |
| 2 <i>D. scabriuscula</i> | 9 <i>S. anomala</i> | 16 <i>A. præcox</i> | 23 <i>T. fimbria</i> |
| 3 <i>N. popularis</i> | 10 <i>C. quadripunctata</i> | 17 <i>N. plecta</i> | 24 <i>T. comes</i> |
| 4 <i>C. graminis</i> | 11 <i>A. suffusa</i> | 18 <i>N. augur</i> | 25 <i>P. piniperda</i> |
| 5 <i>M. brassicæ</i> | 12 <i>A. segetum</i> | 19 <i>N. C. nigrum</i> | 26 <i>T. pronuba</i> |
| 6 <i>A. basilinea</i> | 13 <i>A. exclamationis</i> | 20 <i>N. festiva</i> | 27 <i>T. gothica</i> |
| 7 <i>A. didyma</i> | 14 <i>A. tritici</i> | 21 <i>N. zanthographa</i> | |

Some British Moths Described

Zygæna flipendulæ: the Six-Spot Burnet (Plate I., Fig. 4).—There are six members in the family of Burnets. All are blue-black with scarlet markings, but some of their foreign relatives are magnificent, with a wide range of colour. This is a very common species, especially on sand-hills near the coast, where the larvæ may be found feeding on the coarse grass and other low plants. The cocoon, spun on a grass stem, is quite conspicuous. The larva (Plate VII., Fig. 3) appears in June, and the moth in July. Expanse, $1\frac{1}{4}$ inches.

BOMBYCES.—Family LITHOSIIDÆ

Nudaria mundana: the Muslin Moth (Plate I., Fig. 7).—A semi-transparent and fragile little creature which may often be found sitting on old walls and trees. The larva feeds on the lichens which grow there. The moth is out in July. Expanse, about $\frac{3}{4}$ inch.

Calligenia miniata: the Rosy Footman (Plate I., Fig. 8).—Widely distributed and fairly common. Larva on lichen on trees in May. Moth out in June and July. Expanse, slightly under 1 inch.

Calligenia lurideola: the Common Footman (Plate I., Fig. 9).—Larva found from August to May, the moths in July. Expanse, about $1\frac{1}{4}$ inches. In our greater woods and forests, where the trees are well covered with lichen, never neglect to inspect them thoroughly. Nearly all the "Footmen" and several of the *Geometræ* feed on them. These larvæ are mostly well protected by their close resemblance to their food,

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and are therefore hard to find. In feeding them at home, see that the lichen given them is soft and damp.

Gnophria quadra: the Four-Spotted Footman.—Plate I., Fig. 10, represents the female; the male is smaller, a dingy, smoked buff colour, and the four spots are wanting. Larva feeds on lichen in May and June. Moth out in July and August. Expanse: female, nearly 2 inches; male, under $1\frac{1}{2}$ inches. Not uncommon, but local.

Family EUCHELIIDÆ.

Euchelia jacobææ: the Cinnabar Moth (Plate I., Fig. 11).—A very common and handsome species sometimes swarming where Ragwort is abundant; and, as the larvæ are gregarious, any number can be got. When the moth is on the wing, keep a sharp lookout for variations, especially the rare yellow form. Larva (Plate XIV., Fig. 3) is found in July and August, moth in May and June. Expanse, to $1\frac{1}{2}$ inches.

Callimorpha dominula: the Scarlet Tiger (Plate I., Fig. 12).—The Tiger Moths rival the butterflies, and, indeed, surpass many of them in strength of colour and boldness of design. Most of them (including this one) are common. The larvæ hibernate. It is best to seek them in the spring and early summer. *Dominula* feeds on various Deadnettles from September to May. Moth in June and July. Expanse, about 2 inches. There are two occasional yellow and black variations.

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Family CHELONIIDÆ.

Nemeophila russula: the Buff Tiger (Plate I., Fig. 15).—Our figure is a male; the female is much smaller and darker, neither is it so often met with, as it apparently flies very little. The larva, which is black, with red hairs, hibernates, and is difficult to keep over the winter. It feeds on Heath, Heather, or Sallow. The moth is out in June. Expanse, fully $1\frac{1}{2}$ inches. A moorland species, widely distributed and fairly common, though local.

Nemeophila plantaginis: the Wood Tiger (Plate I., Fig. 16).—Seldom seen in woods. Though a local species, it is generally abundant where it occurs, oftenest near the coast. The writer once found the larvæ in great abundance on Ailsa Craig, feeding on Ragwort, towards the end of May. It is black, with red hairs, and is very active. There are three distinct varieties—a very dark one, one with the ground colour red, and one with the ground colour white. The moth is out in June. Expanse, about $1\frac{1}{2}$ inches.

Arctia caia: the Garden Tiger (Plate I., Fig. 17).—The largest and the commonest of our Tiger Moths, and a very handsome one withal. Every schoolboy is familiar with the larva, the “woolly bear” of the garden and country lane (see Plate XIV., Fig. 1). It feeds on almost anything green, but prefers Dock, Ragwort, or Nettles, where it may be found during May and June. The moth is out in July and August. Expanse, about $2\frac{1}{2}$ inches.

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Arctia villica: the Cream-Spot Tiger (Plate I., Fig. 13).—Common locally, but more a southern insect than *Caia*. The larva (Plate XIV., Fig. 4) is like that of *Caia*, but can be readily distinguished by its red head. The head of *Caia* larva is black. It feeds on a number of plants, and thrives well in captivity on Chickweed and Groundsel. Larva in May, moth in July. Expanse, $1\frac{3}{4}$ to 2 inches.

Spilosoma fuliginosa: the Ruby Tiger (Plate I., Fig. 14; larva and cocoon, Plate XIV., Figs. 5 and 5A).—Common, and widely distributed on moors and waste ground. The larva is black, clothed with fox-red hairs. It is generally about fully fed when it retires for the winter, though it does not pupate until the spring. It feeds on Heather, Chickweed, and most low-growing plants, including grass. The moth is out in June. Expanse, $1\frac{1}{4}$ inches.

Spilosoma lubricipeda: the Buff Ermine (Plate I., Fig. 18; larva, Plate XIV., Fig. 2).—A very common moth in both garden and country. Our figure is of a male; the female is of a paler cream colour. Many remarkable varieties of this species are known to collectors, some of which will be found figured on Plate XV. The larva is ash colour, with a light line on either side, and is clothed with buff yellow hairs. It feeds on almost any kind of herbage during July and August. The moth is out in May. Expanse, about $1\frac{1}{2}$ inches.

Spilosoma menthastris: the White Ermine (Plate I., Fig. 19; larva, Plate XIV., Fig. 6).—Common all over the country. Occasionally the ground colour is

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darker than our figure, and the spotting more dense, or it may be found entirely without spots, as shown on Plate XV., Figs. 11 and 12. The larva is almost black, with a yellow or red line along the back. It has black hairs, and is found during August. Moth in June. Expanse, about $1\frac{1}{2}$ inches.

Family HEPIALIDÆ.

Hepialus humuli: the Ghost (Plate I., Fig. 20, male; Fig. 21, female).—Common everywhere, especially on rough pastureland, where the larva feeds underground when young, destroying the roots of grasses. Later, during August, it may be found *in* the roots of Dock and Ragwort. All of this genus are subject to “grease” in the cabinet, and should be treated with the benzine process. The moth is out in June. Expanse, 2 to $2\frac{1}{2}$ inches.

Hepialus velleda: the Northern Swift (Plate I., Fig. 22).—Widely distributed all over the British Isles; seen at its best on hilly country among Bracken, on the roots of which the caterpillar feeds. Flying low and swift about the Bracken, it soon gets rubbed. The pattern on the wings varies greatly; in some specimens it vanishes altogether, and is replaced by a uniform brown. Flies in June. Expanse about $1\frac{3}{4}$ inches.

Hepialus hectus: the Gold Swift (Plate I., Fig. 23).—The smallest of the tribe, and fairly common; always found on or about Bracken, on the roots of which the larvæ feed. The moth is out in June and July; like all the Swifts, it flies early in the evening when the sun

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is getting low. There is a variety with silver spots on the hind-wings. Expanse, slightly over 1 inch.

Family COSSIDÆ.

Cossus ligniperda : the Goat Moth (Plate IV., Fig. 1).—A wood-boring species affecting Willow, Ash, Poplar, and Elm. The presence of the larva gives rise to an unpleasant odour, hence the name. The moth may be found resting on tree-trunks during July, and is not uncommon in the South. Expanse, $2\frac{1}{2}$ to 3 inches.

Zeuzera pyrina : the Wood Leopard (Plate IV., Fig. 2).—Also a wood-borer. Happily, these insects are not numerous enough to be a serious menace to our fruit or forest trees. The moth appears during July and August. Expanse, about $2\frac{1}{2}$ inches.

Family LIPARIDÆ.

Porthesia similis : the Gold Tail (Plate IV., Fig. 6).—Our figure is that of a male in many specimens of which there is a distinct black spot near the bottom angle of the fore-wing. The larva is black, with a red line along the sides, then a frosted white line nearer the back, and lastly a double red line along the back. It is hairy, and to sensitive skins the hairs are extremely irritating. Larva (Plate VI., Fig. 2) September to May, on hedges and fruit-trees ; moth in July. Expanse, about $1\frac{1}{4}$ to $1\frac{1}{2}$ inches.

Ocneria dispar : the Gipsy Moth (Plate IV., Fig. 7).—Our figure is of a male ; the female is larger, and of a light grey colour. At one time common, now scarce,

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and mostly kept up by breeding. In some parts of the United States of America, where it was accidentally introduced, it has proved a veritable scourge, and the Government have spent large sums in trying to exterminate it. The larva (Plate VI., Fig. 6) feeds on most kinds of trees during May. Moths out in July. Expanse, $1\frac{1}{2}$ to about 2 inches.

Psilura monacha: the Black Arches (Plate IV., Fig. 8).—A rather local species. While it only holds its own with us, it is occasionally a plague in other countries. The larva is to be found on forest and fruit trees from May to July. The moth appears in August. Expanse, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches.

Dasychira pudibunda: the Pale Tussock (Plate IV., Fig. 9).—A common species, but confined to the South, where it is sometimes numerous enough to be destructive. The larva is figured on Plate III., Fig. 4. It feeds on most trees and bushes during August and September. The moth is out in May and June. Expanse: male, $1\frac{1}{2}$ inches; female, 2 inches.

Orgyia antiqua: the Vapourer (Plate IV., Fig. 10; female, Fig. 11).—A very common, widely-distributed, and noteworthy little moth. The male flies during the day, and loves to dash about in the sunshine. There is not, however, much dash about the poor little wingless female; she is generally found within a few inches of the loose cocoon enclosing the empty pupa-case from which she was born, and there, too, she often lays her eggs in a mass. The beautiful and odd-looking larva (Plate II., Fig. 3) feeds on trees, bushes,

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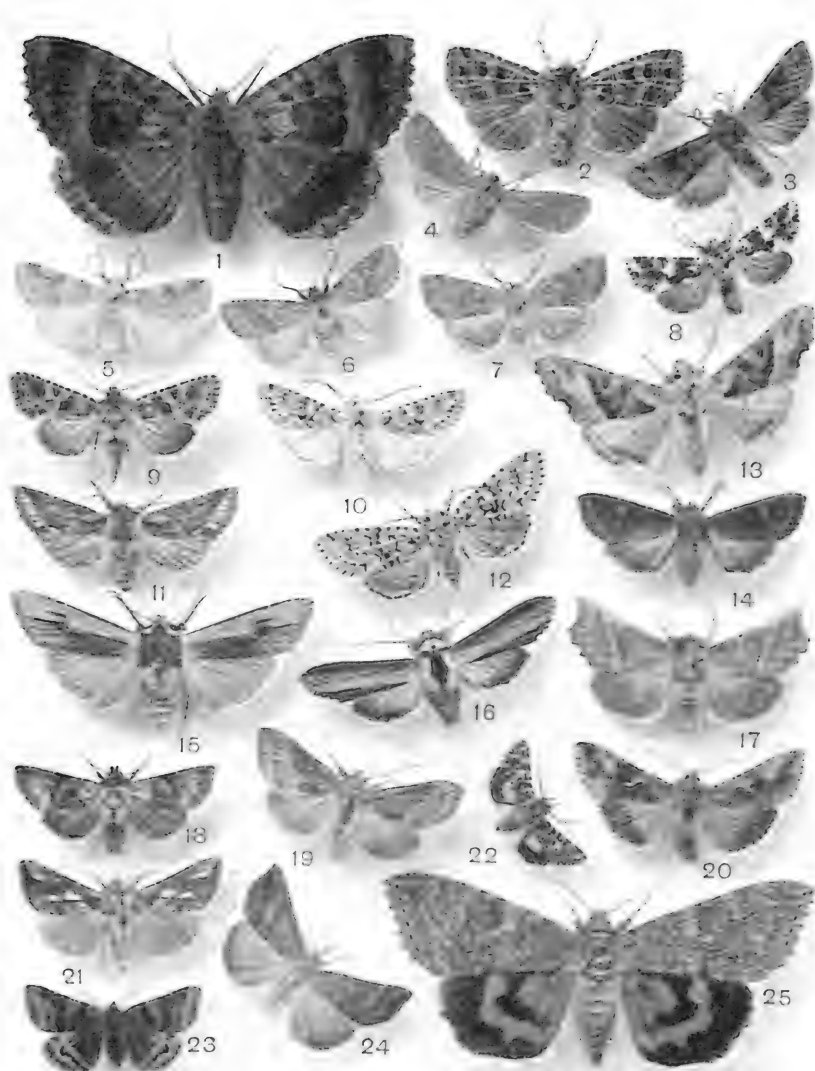
heather ; indeed, nothing in the way of food seems to come amiss to it. It is found during the summer, and the moth in the autumn. Expanse, $1\frac{1}{4}$ inches.

Family BOMBYCIDÆ.

Bombyx neustria : the Tree Lackey (Plate IV., Fig. 13 ; larva and cocoon, Plate VI., Figs. 5 and 5A).—A pretty little *Bombyx*, and the larva is easy to rear, as it feeds on most forest and orchard trees. The eggs hatch in the spring, and the young larvæ keep together for some time, so that a whole brood may often be found together. It is a common southern species. Larva in April and May, moth in July. Expanse: males, to $1\frac{1}{4}$ inches ; females, to $1\frac{1}{2}$ inches.

Bombyx castrensis : the Ground Lackey (Plate IV., Fig. 12).—Not so common as the last species, being confined almost to the South-East Coast, where the larva lives on a number of shore plants in May and June. The moth may be found at rest there during July. Expanse: male, $1\frac{1}{8}$ inches ; female, $1\frac{1}{2}$ inches.

Bombyx rubi : the Fox (Plate IV., Fig. 3).—The figure is that of a male ; the female is of cinder grey colour. Best obtained by “assembling.” The larva (Plate VI., Fig. 3) is common enough on Bramble or moorland during August. It hibernates, and is not fully fed until the spring ; it is most difficult to keep it from drying up or going mouldy, if an attempt be made to rear it during the winter. “Sleeving” outside is the most successful plan. When young the larvæ are a beautiful velvety black, with yellow rings at the



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|-----------------------|-------------------------|-------------------------|--------------------------|
| 1 <i>M. maura</i> | 8 <i>D. nana</i> | 14 <i>H. oleracca</i> | 20 <i>P. gamma</i> |
| 2 <i>M. typica</i> | 9 <i>D. capsincola</i> | 15 <i>C. vetusta</i> | 21 <i>P. festuca</i> |
| 3 <i>T. incerta</i> | 10 <i>P. chi</i> | 16 <i>C. verbasci</i> | 22 <i>A. myrtilli</i> |
| 4 <i>T. stabilis</i> | 11 <i>M. oxyacanthæ</i> | 17 <i>G. libatrix</i> | 23 <i>E. glyphica</i> |
| 5 <i>Z. fulvago</i> | 12 <i>A. aprilina</i> | 18 <i>H. tripartita</i> | 24 <i>H. proboscidea</i> |
| 6 <i>Z. flavago</i> | 13 <i>P. meticulosa</i> | 19 <i>P. chrysitis</i> | 25 <i>C. nupta</i> |
| 7 <i>C. trapezina</i> | | | |

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junctions of the segments. The moth flies in June. Expanse, $1\frac{1}{2}$ to $2\frac{1}{2}$ inches, or more. It is found all over the country.

Bombyx quercus : the Oak Eggar (Plate IV., Fig. 4 ; larva cocoon, and parasitic ichneumon, Plate II., Figs. 1, 2, and 8). Our figure is that of a male, which may expand to $2\frac{1}{2}$ inches ; the female is quite 1 inch more in expanse, and is of pale buff ground colour. There are two distinct races of this handsome moth, the southern feeding on Oak, light in colour, with the transverse line on the fore-wings nearly straight ; the northern feeding on Heather, dark chocolate in colour, with the transverse line distinctly fiddle-shaped. The moth flies boldly in the sunshine with the speed of a rocket. "Assembling"—i.e., attracting males by means of a captive virgin female—is the only method of bringing them within reach of a net. It is better to rear the larvæ, which hibernate when about 1 inch long. They should be looked for in their second season, from May to July, and, in the North, to August. The larvæ should not be handled with bare fingers ; their hairs stick in the skin and are exceedingly irritating.

Odonestis potatoria : the Drinker (Plate IV., Fig. 5).—Said to have a habit, in passing over a sheet of water, of dipping down and touching the surface. Occasionally comes to light. The figure is that of a male, which expands to nearly 2 inches ; the female is of a light ochreous yellow for the ground colour, and is $2\frac{1}{2}$ inches across the wings. A very common species everywhere in July and August. The larva (Plate VII., Fig. 5)

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feeds on grasses and low herbage during autumn, and again in the early summer.

Lasiocampa quercifolia: the Lappet (Plate IV., Fig. 14; larva, Plate III., Fig. 1).—Fairly common and widely distributed in the southern half of the kingdom. The large and conspicuous larva is easy to rear, and may be found from autumn to May on Willow, Sloe, Plum, Bramble, and many other trees and shrubs. The moth appears during June and July and is often found at rest, its resemblance to a withered leaf being its best protection. Expanse: males, to $2\frac{1}{2}$ inches; females, to 3 inches.

Family ENDROMIDÆ.

Endromis versicolor: the Kentish Glory (Plate IV., Fig. 15).—Though not by any means a common species, it is not difficult to obtain this fine moth. The larva or pupa can be had most seasons very cheaply from dealers, or it can be got by exchange, as quite a number of entomologists breed it regularly. This species is found in the South of England and in Perthshire. It flies in the daytime during April. The larva (Plate VI., Fig. 1) may be beaten from birch in June and July. Expanse of moth, $2\frac{1}{4}$ inches.

Family SATURNIIDÆ.

Saturnia pavonia: the Emperor (Plate IV., Fig. 16).—Occurs all over the British Isles among Heather and Sallow. Flies boldly during sunshine in May. The larva may be found feeding on Heather and Sallow in

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July and August. Larva and cocoon are figured on Plate II., Figs. 5 and 6. Expanse of wings of moth : male, $2\frac{1}{4}$ inches; female, 3 inches. The figure is of a male; the female is light grey in tone; it lacks the tawny yellow and brown of the male, but it is equally beautiful in its more sombre dress.

Family DREPANULIDÆ.

Drepana lacertinaria : the Hook-Tip (Plate V., Fig. 5).—The Hook-Tips are a very small but interesting group comprising only half a dozen species, of which this is, perhaps, the commonest and most widely distributed. Double-brooded in the South, the moth being out in May and September; in the North there is only one brood, in June. Larva on Birch and Heather, in July and August. Wing-expanse, $1\frac{1}{8}$ inches.

Drepana falcataria : the Pebble Hook-Tip (Plate V., Fig. 4).—Does not reach so far North as the last species, but is equally common in the South, where it is also double-brooded. The moth is out in May and August; and between these times the larva may be found on Birch and Alder, where it forms a protecting shelter of leaves spun together with silken threads. Wing expanse, $1\frac{3}{8}$ inches.

Family DICRANURIDÆ.

Dicranura vinula : the Puss Moth (Plate V., Fig. 1; larva and cocoon, Plate III., Figs. 3 and 3A).—The beautiful larva of this species is always a great favourite with youthful entomologists. It is found all over the

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country wherever Willow and Sallow abound; unfortunately, it does not preserve well, as its beautiful colours fade in the drying. The cocoon may be searched for during the winter, on or near Sallow and Willow; any angle, corner, crack, or crevice, serves the purpose of the larva. Biting fragments from its surroundings, it makes a rough-cast exterior to correspond therewith, while internally the cocoon is smooth and shining. The glutinous secretion used in the work soon becomes very hard, and in this well-secured retreat the pupa passes the winter. The moth emerges in May and June, and the larva can be had in July and August. Wing expanse to $2\frac{1}{2}$ inches.

Family NOTODONTIDÆ.

Lophopteryx camelina: the Coxcomb Prominent (Plate V., Fig. 2).—The members of this family can all be taken at light, but seldom come to sugar. Most cabinet specimens are bred, as they are all easy to rear, and the larvæ not difficult to obtain by beating Birch during July and August. Very pretty and odd larvæ they are, preserving fairly well. *Camelina* is common everywhere on Beech and Birch. Moth out in June. Measures $1\frac{1}{4}$ to $1\frac{3}{4}$ inches.

Notodonta dictæa: the Swallow Prominent (Plate V., Fig. 8).—Fairly common from Aberdeenshire to the South of England. The larvæ feed on Poplar, Willow, and Birch. The moth is double-brooded in the South, May and August; in the North there is only a June brood. Expanse, $1\frac{3}{4}$ inches or more.

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Notodonta dromedarius: the Iron Prominent (Plate V., Fig. 11).—Also a common species on Birch, where it may be found resting on the trunks during the day. The moth is inconspicuous, but the larva (Plate III., Fig. 2) is a dandy; yellow and red, with four humps on his back and one at the tail, his identity is unmistakable. The colours stand very well in the preserved larva. Same habits and time as *Dictæa*. Expanse, $1\frac{1}{2}$ to 2 inches.

Notodonta ziczac: the Pebble Prominent (Plate V., Fig. 14).—Expanse, $1\frac{3}{4}$ inches. Common and widely distributed. Similar habits and time of appearing as in the former species. The larva is a magnificent creature, slate blue and red, with yellow lines and two humps. Feeds on Poplar, Sallow, and Oak.

Family PYGÆRIDÆ.

Phalera bucephala: the Buff Tip (Plate V., Fig. 17; larva, Plate III., Fig. 5).—The commonest, the largest, and the prettiest, of all the pseudo-Bombyces. Wing expanse, to $2\frac{1}{4}$ inches. Moth out in May and June. I remember passing along a path under some oak-trees and coming upon parts of the path sprinkled heavily with finely chopped leaves. Looking up, I saw several bare boughs, and some in process of being stripped. A brood of *Bucephala* was at work in its usual way; being gregarious, numerous, and of a good size, the larvæ were making their presence evident, and leaving many clean branches behind them. When fully fed they pupate at the foot of the tree on which they feed.

Pygæra curtula: the Chocolate Tip (Plate V.,

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Fig. 20).—Expanse, $1\frac{1}{4}$ inches. Local, but not uncommon on Poplar and Sallow. It is double-brooded, the moth being out in early May, and again in July. The larva may be found all through the summer.

Family CYMATOPHORIDÆ.

Thyatira derasa: the Buff Arches (Plate V., Fig. 3).—The Cymatophoridæ are a small family of three genera and nine species which were formerly classed with the Noctuæ. According to the neururation of the wings, they differ slightly both from the pseudo-Bombyces and the Noctuæ. *Dersa* is a fairly common species; the larvæ feed on Bramble and Raspberry, and are not difficult to rear; they are found in August and September. Moth in June and July. It comes to sugar. Expanse, $1\frac{1}{2}$ inches.

Thyatira batis: the Peach Blossom (Plate V., Fig. 7).—Also feeds on Bramble and Raspberry, but more openly than the last species. In fact, the larvæ of the whole of this group have a peculiar habit of sunning themselves on an open leaf, and there bending themselves almost double, like a horseshoe; while resting in this position they greatly resemble bird-droppings, and are thus, no doubt, often overlooked by enemies. *Batis* comes freely to sugar. Larva in August and September, moth in June. Expanse, rather over $1\frac{1}{4}$ inches. Common nearly everywhere.

Asphalia flavicornis: the Yellow-Horned Moth (Plate V., Fig. 6).—Expanse, $1\frac{1}{2}$ inches. A common, widely-distributed species appearing in early spring.

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It may be found at rest on Birch trunks and palings in March in the South, and April in the North. I have also taken it at Sallow catkins. The larva may be beaten from Birch and Oak in June and July.

NOCTUÆ.—Family BRYOPHILIDÆ.

Bryophila perla: the Marbled Beauty (Plate V, Fig. 22; larva, Plate X., Fig. 8).—This pretty little moth may be found quite commonly at rest on lichen-covered walls in July. The larvæ feed on Lichen, and pupate under it; but, as both moth and larva blend beautifully with their surroundings, it requires some little experience and keen observation to detect them. April and May are the best times to hunt for the larva. A very variable moth. Expanse, 1 inch.

Family BOMBYCOIDÆ.

Moma Orion: the Scarce Marveil-du-Jour (Plate V., Fig. 10).—Though not a common moth, it is too pretty to be omitted. The larva feeds on Birch and Oak from July to September. The moth is out during June and July, and has been taken at both light and sugar, but only in the South. Expanse, $1\frac{1}{4}$ to $1\frac{1}{2}$ inches.

Acronycta psi: the Hedge Dagger (Plate V., Fig. 13; larva, Plate X., Fig. 11).—Comes freely to sugar in June, and is a common moth everywhere. Expanse, to slightly over $1\frac{1}{2}$ inches. The handsome larva, with its odd little hump, is found on Elm, Rose, Bramble, Hawthorn, and many other trees and bushes, during August and September.

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Acronycta rumicis: the Knot Grass (Plate V., Fig. 9; larva, Plate X., Fig. 9).—Also comes to sugar in June, and is very common everywhere. Expanse, $1\frac{1}{2}$ inches. The beautiful larva can be found in August and September on all manner of roadside herbage, having, perhaps, a preference for Dock and Lady's-Mantle (*Alchemilla vulgaris*).

Diloba cæruleocephala: the Figure 8 (Plate V., Fig. 16; larva, Plate X., Fig. 10).—A common species, widely distributed. The figure 8 on the wings is obtained by an apparent doubling of the orbicular stigma—a very unusual proceeding. It will be noted that these spot-like marks persist in one form or another all through the Noctuæ. They are useful guides to identification, and by reference to Fig. 2, p. viii, the names and position of these spots will be learned. The moth is out in September. Expanse, $1\frac{3}{8}$ inches. The larva is found on fruit trees in May and June.

Family LEUCANIIDÆ.

Lucania conigera: the Brown Line (Plate V., Fig. 12).—Expanse, $1\frac{1}{4}$ inches. Comes to sugar and light; it is also taken abundantly in some districts at flowers. The writer has taken thirty in twenty minutes at the bloom of Willow-Herb on an evening early in July. Larva on grasses from March to May.

Leucania impura: the Smoky Wainscot (Plate V., Fig. 19).—It requires some little discrimination to identify correctly each member of the Wainscot family. The species immediately before this one and the one

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that follows it (*L. straminea* and *L. pallens*) resemble each other very much. The underwings of *Impura* are dark and smoky, much darker than those of the other two species. The upper wing of *Pallens* is a warm reddish-yellow or rich straw colour. They all fly about the same time (July), generally early in the evening, and are attracted by the flowers of Rushes. The larvæ live and feed on Grasses and Rushes from March to May. Expanse of moth, $1\frac{3}{8}$ inches.

Tapinostola fulva: the Small Wainscot (Plate V., Fig. 21).—Abundant, but local. Flies late in the summer (end of August) over rushy moorlands. It pops up, generally in swarms, just as the last rays of the setting sun are slanting over the moor, and a merry, mazy dance it has; but it is brief, for in a quarter of an hour all will have disappeared as mysteriously as they came forth. So, to secure a good series, one must work hard while the flight is on. When pursued, these moths often drop into the grass quite suddenly, and lie on their backs well hidden in the dense tangle. They also display stratagem if suddenly taken in the net: with wings and legs close pressed to the body, they sham death, and will roll about in the bottom of the net, hoping to escape attention. It is a curious trait. Specimens are exceedingly variable in colour, from dark mahogany red to light straw and various shades of grey. The larvæ feed in the roots and stems of Rushes in May and June. Expanse of moth, about 1 inch.

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Family APAMEIDÆ.

Gortyna ochracea: the Frosted Orange (Plate V., Fig. 23).—Expanse, to $1\frac{1}{2}$ inches. Common at light, flowers, and sugar, in September. The larva, which is large and maggot-like, with a red head, is much prized by anglers as a bait for trout. It is found in July and August in the stems and roots of Burdock, Thistles, and Ragwort.

Hydræcia nictitans: the Ear Moth (Plate V., Fig. 15).—Common in fine weather, in daytime, at the flowers of Ragwort, where it sits and sucks until quite intoxicated. Varies much in size, and the reniform stigma may be white, yellow, or red. The larvæ live underground on the roots of Grasses in May and June. The moth is out in August. Expanse, $1\frac{1}{4}$ inches.

Hydræcia micacea: the Rosy Rustic (Plate V., Fig. 18).—Expanse, $1\frac{1}{4}$ to $1\frac{1}{2}$ inches. The rosy bloom which overspreads the wings of this species soon disappears as the moth bangs about during the daytime. It also is easily taken on the flowers of Ragwort. It appears in August. Larvæ are found in June in the roots of *Spirea* (Queen of the Meadow). I once had a large plant of *Spirea filipendula* in my garden destroyed by a brood.

Xylophasia rurea: the Clouded Brindle (Plate V., Fig. 24).—The figure is of the dark variety known as Var. *Combusta*. Expanse, $1\frac{1}{2}$ inches. A typical specimen is very different, the ground being a creamy ochreous white with rust-red markings. There are



1. Larva of *Odontoptera bidentata*
2. Larva of *Hypsipetes sordidata*
3. Larva of *Halia vauaria*, two vars.
4. Larva of *Eugonia autumnaria*
5. Larva of *Melanippe fluctuata*
6. Larva of *Abraxas grossulariata*

- 7
- 6A. Pupa of *A. grossulariata*
7. Larva of *Nyssia hispidaria*
8. Larva of *Bryophila perla*
9. Larva of *Acronycta rumicis*
10. Larva of *Diloba cæruleocephala*
11. Larva of *Acronycta psi*

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many intermediate forms. The moth is usually common at sugar in June. The larva feeds on Grasses during April and May.

Xylophasia monoglypha: the Dark Arches (Plate VIII., Fig. 1).—Expanse, $1\frac{3}{4}$ inches. Like *Rurea*, this moth varies from light specimens, as figured, to Var. *Infuscata*, which has the fore-wings perfectly black (see Plate XV., Fig. 7). A long series may be secured between these two extremes. It is an exceedingly common moth—too common at sugar, where it is often a nuisance. The larvæ feed underground on Grass roots till May.

Dipterygia scabriuscula: the Bird's Wing (Plate VIII., Fig. 2).—Expanse, rather under $1\frac{1}{2}$ inches. On some specimens the bird's-wing mark is very realistic; it occupies the outer lower angle of the fore-wings. The moth is out in June and July, and is not uncommon. The larva feeds on various species of Dock.

Neuronia popularis: the Feathered Gothic (Plate VIII., Fig. 3).—Expanse, to $1\frac{1}{2}$ inches. The antennæ of the male are long and well feathered; in the female they are simple. The neuration of the fore-wings and the outlining of the stigmata, so clearly emphasized in white, render this species interesting as a study in venation, as one does not need to brush the scales off to observe it. Comes to sugar in July and August. Local, but not uncommon. Larva, April and May, at roots of Grasses.

Charæas graminis: the Antler Moth (Plate VIII., Fig. 4).—Another grass root feeder, common everywhere, and occasionally in such numbers as to seriously

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injure pasture lands. The moth can readily be got by day at Ragwort flowers in July and August. Expanse, $1\frac{1}{4}$ to $1\frac{1}{2}$ inches.

Mamestra brassicæ: the Cabbage Moth (Plate VIII., Fig. 5).—Only too well known by its works in suburban gardens. No vegetation is safe from this pest. I have seen even plants in window-boxes stripped bare by it. Moth on wing from May to August. Expanse, to $1\frac{3}{4}$ inches. Larva represented on Plate XIV., Fig. 9.

Apamea basilinea: the Shoulder-Knot (Plate VIII., Fig. 6).—Expanse, rather under $1\frac{1}{2}$ inches. Common everywhere, especially at sugar, in June. Larva on various Grasses, and said to be destructive to growing Wheat, from August to March.

Apamea didyma: the White Ear (Plate VIII., Fig. 7).—Expanse, $1\frac{1}{4}$ inches. One of the most variable insects on our list; it is quite possible to fill a drawer with specimens, and not have two alike. The figure represents a dark form. Nevertheless, the white reniform stigma is very persistent, and appears strongly in at least 75 per cent., and the remaining 25 per cent. have it in varying degree. Very common. Swarms at sugar from June to August. Larva on Grasses in April and May.

Miana fasciuncula: the Middle-Barred Minor (Plate VIII., Fig. 8).—Expanse, about 1 inch. A very common and lively little moth with a wide range of variations. The figure shows the red form, which is not uncommon. Comes to sugar or bloom in June and July. Larva a Grass feeder in early summer.

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Family CARADRINIDÆ.

Stilbia anomala: the Anomalous (Plate VIII., Fig. 9).—A local species occurring on rough hillsides among Bracken and Heather. Where it does turn up, it is usually common enough. It flies early in August, just before darkness sets in, and the large pearly underwing renders it rather conspicuous and not difficult to capture. The larva is a Grass feeder, and may be found in May and June. The female is smaller than the male, and has the upper wing almost devoid of marking; it is also scarcer. Expanse, $1\frac{3}{8}$ inches.

Caradrina quadripunctata: the Hay Moth (Plate VIII., Fig. 10).—One of the commonest of moths all through the summer. The larva is a very general feeder, attacking Cabbage, Grass, Chickweed, Hay, Clover, and other herbage. This is the moth referred to on p. 25. Expanse, nearly $1\frac{1}{4}$ inches.

Family NOCTUIDÆ.

Agrotis suffusa: the Dark Sword Grass (Plate VIII., Fig. 11).—Expanse, to 2 inches. Finds its way readily and in some numbers to sugar in early October. Females, usually worn, are not infrequently taken at Sallow bloom in March. They are useful for supplying eggs. The larvæ feed on the roots of Grasses during the summer months.

Agrotis segetum: the Turnip Moth (Plate VIII., Fig. 12).—Expanse, to nearly $1\frac{1}{2}$ inches. A very variable species, both in colour and time of appearing. I have taken it from June to October, when it comes to

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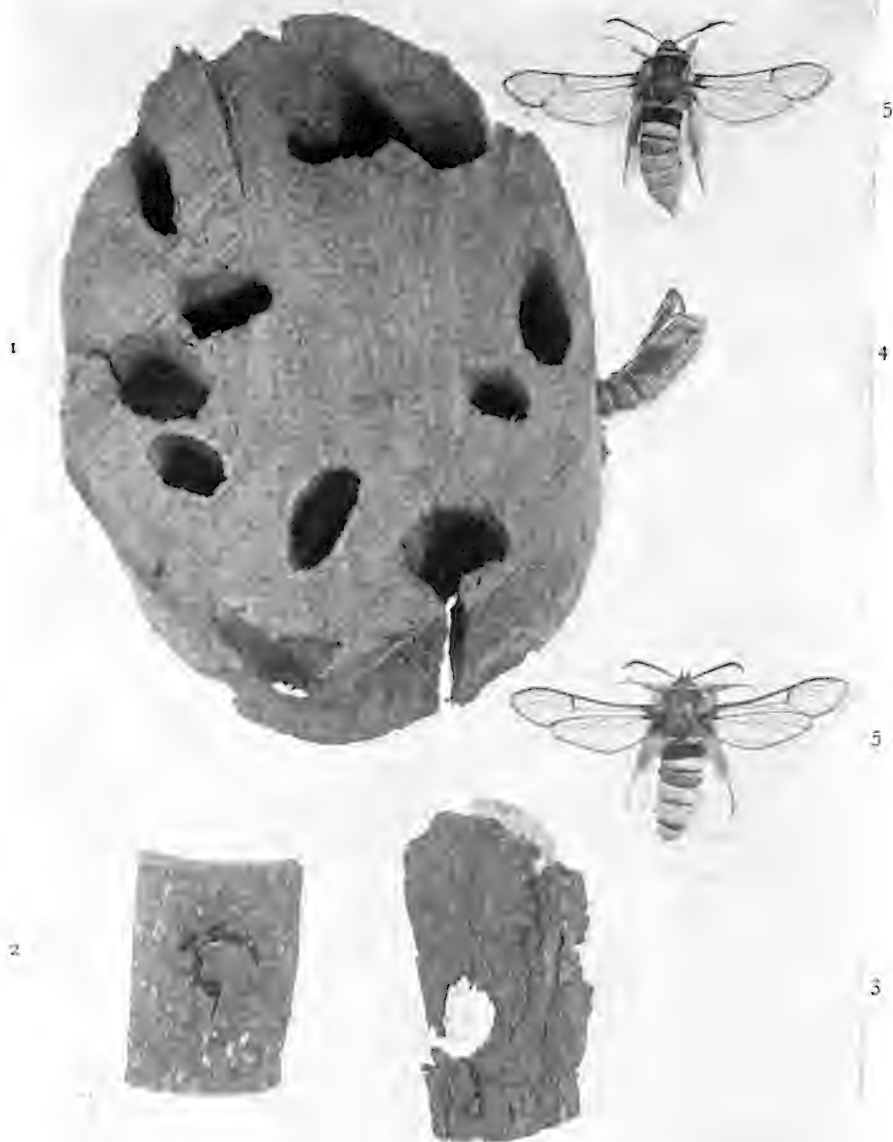
sugar. In July it comes to flowers. A pest to farmers, and, as the larva works under the ground, the damage it is doing is not always immediately apparent. Corn, Hay, and Turnip roots, are alike destroyed.

Agrotis exclamationis: the Heart and Dart (Plate VIII., Fig. 13).—Expanse, to $1\frac{1}{2}$ inches. Quite a common moth everywhere at sugar from June to August. Larva a root feeder attacking Grass, Turnip, etc., and I have found it in the heart of a Cabbage. It is found from September to May.

Agrotis tritici: the White-Line Dart (Plate VIII., Fig. 14).—The genus *Agrotis* is a big one, containing many variable species, and *Tritici* mimics about half of them, so that it becomes rather difficult at times to distinguish them. Once I saw *Tritici* in thousands at Ragwort bloom on the sand-hills near the Mull of Kintyre, and the variations seemed to be endless, many of them very striking and beautiful, and very far removed from the type. August was the month. Larva at the roots of various shore plants in June and July.

Agrotis strigula: the Lovers' Knot (Plate VIII., Fig. 15).—Expanse, to $1\frac{1}{8}$ inches. A very pretty little moth commonly found sporting over Heather in day-time. By beating the Heather either late in autumn or early spring, the larvæ can usually be had in some numbers. It is not difficult to rear.

Agrotis præcox: the Portland Moth (Plate VIII., Fig. 16).—Fairly general wherever there are extensive sand-hills, at Ragwort flowers, from July to September. The larva feeds on various low plants on the shore,



1. Section of sawlog mined by *Trochilium crabroniformis* (5)
2. Piece of sawlog bark showing exit hole with the cap on
3. Another with the cap off
4. Empty pupa-case as it appears at the exit after the moth has hatched

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where its presence can be detected by the "frass" it leaves behind; so if the sand be scraped away in the neighbourhood, the larva hiding under the surface will generally be disclosed. A beautiful moth, and well worth the trouble of rearing. Expanse, $1\frac{1}{2}$ inches.

Noctua augur: the Double Dart (Plate VIII., Fig. 18).—Expanse, to $1\frac{1}{2}$ inches. Sure to turn up at sugar in June and July. The larva while quite small hibernates amongst dead leaves under hedgerows. It is brown, with small black and white spots (see Plate VII., Fig. 7). It wakes up in the early spring and nibbles the tender blades of Grass; later it attacks the half-open buds of the hedges, and finishes with Dock when nearly fully fed.

Noctua plecta: the Flame Shoulder (Plate VIII., Fig. 17).—The beautiful deep crimson of the ground colour of this little moth soon fades from cabinet specimens; but it is very common, and my best results have been obtained by killing bred specimens with laurel. Don't use ammonia for this species. The larvæ hibernate, and may be found on—or, rather, under—various species of Bedstraw in April. We may here remark that nearly all these hibernating larvæ feed during the early hours of the night—that is to say, immediately after dark. By beating or shaking the hedgerow bushes, by sweeping amongst Heather, and by sweeping or picking them off blades of Grass on grassy banks—of course using a good lamp—a large number of them may be got during April, or even earlier. *Plecta* expands to about $1\frac{1}{8}$ inches.

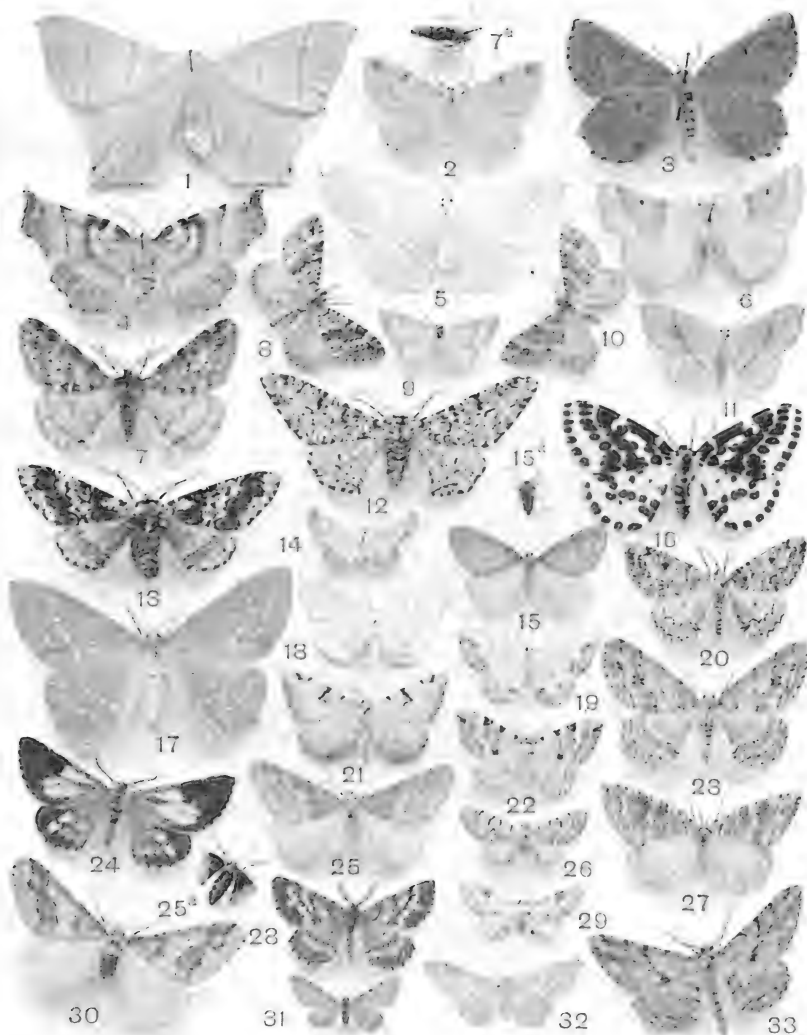
Noctua C-Nigrum: the Hebrew Character (Plate

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VIII., Fig. 19).—Expanse, to $1\frac{1}{2}$ inches. Widely distributed and very common, especially at sugar. The main brood appears to occur in June, but good specimens turn up at sugar all through the summer. The larva hibernates, and may be had, like many of its tribe, feeding on various low plants in the spring.

Noctua festiva: the Engrailed Clay (Plate VIII., Fig. 20).—Very common and variable. Comes freely to sugar in June and July. Where bunches of Heather overhang rocks or banks, get your net well under the roots, and shake them over it. You can *always* get *some* larvæ in this way, and if the month is May you can be pretty sure *N. festiva* will be amongst your captures. It is of a beautiful dark brown, with black zigzag lines on the back (see Plate II., Fig. 7); will eat a number of plants, but Heather varieties, and especially those from the hills, are distinct and dark. Expanse of moth, $1\frac{1}{4}$ inches.

Noctua zantographa: the Square-Spotted Rustic (Plate VIII., Fig. 21).—Common enough to be a nuisance during the month of August. At light, flowers, sugar, or working with the net, every second insect is sure to be the Square Spot. If you see Primroses in May ragged and bitten, with buds half consumed, if you look under the outer leaves during the day or examine the flowers by lamplight, the culprit can be caught “red-handed.” It may be some other species, but the chances are it will be the larva of *Zantographa*. It is reddish clay-colour, with light lines on the back and a dark one along the sides. Expanse of moth, $1\frac{1}{2}$ inches.



- | | | | |
|-------------------------------|--------------------------------|---------------------------|-----------------------------------|
| 1 <i>U. sambucaria</i> | 9 <i>E. albulata</i> | 17 <i>G. papilionaria</i> | 25a <i>H. marginaria</i> (female) |
| 2 <i>R. luteolata</i> | 10 <i>L. didymata</i> | 18 <i>C. pusaria</i> | 26 <i>E. venosata</i> |
| 3 <i>A. prunaria</i> | 11 <i>Z. punctaria</i> | 19 <i>A. ornata</i> | 27 <i>O. dilutata</i> |
| 4 <i>P. bilunaria</i> | 12 <i>A. betularia</i> | 20 <i>C. lichenaria</i> | 28 <i>E. atomaria</i> |
| 5 <i>M. margaritaria</i> | 13 <i>A. strataria</i> | 21 <i>H. vauaria</i> | 29 <i>E. oblongata</i> |
| 6 <i>C. elinguararia</i> | 14 <i>A. bisetata</i> | 22 <i>L. viridaria</i> | 30 <i>H. defoliaria</i> |
| 7 <i>P. pedaria</i> | 15 <i>H. brumata</i> | 23 <i>T. biundularia</i> | 31 <i>E. satyrata</i> |
| 7a <i>P. pedaria</i> (female) | 15a <i>H. brumata</i> (female) | 24 <i>B. piniaria</i> | 32 <i>A. aversata</i> |
| 8 <i>L. caesiata</i> | 16 <i>A. grossulariata</i> | 25 <i>H. marginaria</i> | 33 <i>B. gemmaria</i> |

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Triphæna ianthina : the Lesser Broad - Bordered Yellow Underwing (Plate VIII., Fig. 22).—Expanse, $1\frac{1}{2}$ inches. There are six different species of Yellow Underwings, and they are all more or less variable. *Ianthina* is fairly common at sugar during July. I have picked up many fine specimens under electric standards at night. They fly madly at the globes, get stunned with the impact, and flutter to the ground. I notice they recover in a short time and make off. The larva may be found in the spring on Primrose and allied plants, such as Auriculas, etc.

Triphæna fimbria : the Broad - Bordered Yellow Underwing (Plate VIII., Fig. 23).—While the underwing of this fine species remains very constant in colouring, the upper wing is just the reverse. Its ground colour may be light buff, olive brown, nut brown, dark grey, or nearly black. Comes to sugar in July and August. The larva feeds on Primrose and other low plants. Expanse of moth, $2\frac{1}{8}$ inches.

Triphæna comes : the Lesser Narrow - Bordered Yellow Underwing (Plate VIII., Fig. 24).—This and *T. orbona* are the only two members of the family likely to be confused. *Orbona* can be distinguished by a black dash near the tip of the fore-wing, just at the costal end of the submarginal line. This mark is not present in *Comes*. *Orbona* is scarce; *Comes* is very abundant, from Caithness to Cornwall. Its range of variation is endless. Generally, northern specimens are very dark, with the stigmata outlined in white. Larva represented on Plate VII., Fig. 6; food and conditions same as

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other *Triphæna*. The moth is got at sugar and Ragwort flowers in July and August. Expanse, $1\frac{5}{8}$ inches.

Triphæna pronuba: the Yellow Underwing (Plate VIII., Fig. 26).—Known to everyone who keeps an open window on a summer night. *Pronuba* is a strong and bold insect who makes his presence known when he enters a room, where he is quite capable of smashing an unprotected gas-mantle. If he be grabbed in the hand, he has no mind to remain a prisoner, and before you are aware he will slip through your fingers, as if he were French-chalked. He is as variable as lively, hardly two specimens being exactly alike on the upper wings. A nuisance at sugar, of which he never seems to get enough. Larva on Plantain, Dock, Grass, Primrose, and other low plants (see Plate VII., Fig. 8).

Family AMPHIPYRIDÆ.

Mania typica: the Gothic (Plate IX., Fig. 2).—Expanse, to $1\frac{3}{4}$ inches. Common in suburban gardens in June and July, both at bloom and sugar. The larvæ have to be watched for in the spring, when they are sometimes very destructive, mainly to the flower-buds of Primulas and Auriculas. The damage is often attributed to slugs. It spins a light cocoon in a corner of a wall or fence in May.

Mania maura: the Old Lady (Plate IX., Fig. 1).—Though sombre in colour, this moth is by no means “unbraw,” as the Scots would say; fine specimens have a quiet beauty all their own. On the wing in July and

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August ; frequently met with at sugar. The larvæ feed indiscriminately on Dock, Chickweed, Ivy, and Sallow, in the autumn, and again in the spring. They hide during the day. Expanse of moth, $2\frac{1}{2}$ to $2\frac{3}{4}$ inches.

Family ORTHOSIIDÆ.

Panolis piniperda: the Pine Beauty (Plate VIII., Fig. 25).—Expanse, to $1\frac{1}{4}$ inches. About Pine-woods in March and April, and even into May, as we go North. Sallow catkins are a great attraction to this fine species, especially those on bushes bordering a pine-wood. For larvæ beat the lower pine branches in June and July ; they generally attack the young growth at the extreme ends of the branches. The larva is green, with a number of white lines on the back and a yellow line on the sides.

Tæniocampa gothica: the Early Hebrew Character (Plate VIII., Fig. 27).—The *Tæniocampæ* are all early moths. There are nine species in the genus ; none of them are rare, though some are local. They are all taken at Sallow catkins, most of them plentifully. *Gothica* is one of the commonest. While the principal markings remain rather constant, the ground colour varies very much, from ash grey through brown to rosy red ; so look out for uncommon varieties. The red form is very pleasing, and perhaps the rarest. The pupæ can be got in numbers at the foot of Oak-trees, just under the turf, any time during open weather in the winter months. Larva on Sallow and Oak, Expanse of moth, $1\frac{1}{4}$ inches.

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Teniocampa incerta: the Clouded Drab (Plate IX., Fig. 3).—The most variable in the whole family. From nearly black to dark brown, then becoming lighter, we have a range of drabs and greys. Some specimens have a finely engrailed pattern; others are unicolorous. It takes a long row to represent *Incerta* worthily. Always plentiful at Sallow catkins, and the hunt for fine varieties becomes an annual pleasure. The pupa is common enough at the base of Oak-trees and under Sallow bushes in the winter. Expanse of moth, to $1\frac{1}{2}$ inches.

Teniocampa stabilis: the Quaker (Plate IX., Fig. 4).—Varies much in ground colour, drab shades predominating; but the pattern on the wings is remarkably stable. The white submarginal line of the fore-wings and the white outline of the orbicular and reniform stigmata are rarely absent. Expanse, $1\frac{3}{8}$ inches.

Zanthia fulvago: the Sallow Moth (Plate IX., Fig. 5).—Orange and yellow are the predominating tints of this rather numerous genus. *Fulvago* is one of the commonest of moths, in the early autumn, at sugar and at Ragwort flowers. By collecting in spring a good supply of Sallow catkins, in the interior of which the young larvæ feed, a good series can be bred. This species also varies somewhat. An occasional specimen can be got with the fore-wings entirely devoid of marking, or showing only a small spot at the base of the reniform stigma. Expanse, to $1\frac{1}{2}$ inches.

Zanthia flavago: the Pink-Barred Sallow (Plate IX., Fig. 6).—Warmer in colour than the last, and equally plentiful. The two are usually taken together. The

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Pink-Bar is slightly the smaller. The larva is found with those of *Fulvago*, so they are usually reared together. Expanse of moth, $1\frac{1}{8}$ inches.

Family COSMIIDÆ.

Calymnia trapezina: the Dun-Bar (Plate IX., Fig. 7).—Common on the borders of Oak-woods at sugar in August and September. The larvæ may be beaten from Oak during the summer. They are said to be cannibal, but I have not found them so. Given plenty of food and space, they are easy to rear. There is an almost black variety of this moth, but it is rare. Expanse, to $1\frac{1}{4}$ inches.

Family HADENIDÆ.

Dianthæcia nana: the Marbled Coronet (Plate IX., Fig. 8).—From Shetland to Land's End this fine species can be found all round our coast, on rocky promontory or sandy bay. Find the food-plant, and *Nana* is almost invariably present. It lives as a larva on the immature seed of *Selene maritima* (the Sea-Campion) in July and August; and as a moth it visits the flowers at dusk, draining the chalice of its sweet nectar, and in return for the banquet it carries pollen from flower to flower, thus insuring a plentiful supply of seed for its progeny. The larvæ are best taken small—in fact, they are easier to find then—and the very young larvæ will have suffered little, if anything, from the attacks of ichneumons, which render a large quantity of fully-fed larvæ useless; moreover, the well-fed larvæ

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forsake the insides of the seed-pods as a resting-place, and hide under stones or under the sand near their food. A few may be found in the pods, but not nearly as many as you would take in the earlier stages. The northern varieties of the moth are generally very dark, and blend with the dark, weather-beaten granite rocks they love to rest upon. Expanse, $1\frac{3}{8}$ inches.

Dianthæcia capsincola: the *Lychnis* (Plate IX., Fig. 9).—I have never found species of *Dianthæcia* readily attracted by sugar, although this and the next species, *Cucubali*, are taken regularly at various flowers in the neighbourhood of which sugar was laid on in abundance; yet in five years I have recorded only one specimen as taken at sugar. In suburban gardens they occur at various flowers, but the open country meadowland, pink with the bloom of Ragged-Robin (*L. flos-cuculi*) is almost a certain haunt of several species. They should be sought early in July and early in the evening. They are very quick in their movements, and, until experience is gained in netting them, more may be missed than captured. The larvæ live in the seed-pods of *Lychnis vespertina*, *L. diurna*, and *Selene inflata*. *Capsincola* is found in the two former, *Cucubali* in the latter, during August. In rearing them, see that they are abundantly supplied with seed-pods, or they will assuredly eat one another. Expanse of *Capsincola*, $1\frac{1}{4}$ inches.

Polia Chi: Grey Chi (Plate IX., Fig. 10).—Usually found resting in the daytime on old walls and rocks, sometimes perfectly concealed by its strong resemblance

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to its surroundings ; yet on two occasions I found quite a number squatted on red sandstone, and visible 20 yards away, while on a mixed wall of red and white sandstone they were equally divided as to choice of resting-place. There is an olive-tinted variety (*V. olivacea*) peculiar to the Border district of Scotland, while northern hill varieties are sometimes very dark. The larva is found in April and May ; it is a very general feeder on bushes and low plants. It is green, with white lines. Expanse of moth, to $1\frac{3}{8}$ inches.

Miselia oxyacanthæ : the Brindled Crescent (Plate IX., Fig. 11).—Common everywhere in September at sugar. Its advent always reminds us that the summer is drawing to a close. There is a very dark variety (Var. *Capucina*), but it lacks the lustrous green beauty of the type. The larva is found on hedgerows during the summer. As usual, it is best to beat for it after dark. Expanse of moth, $1\frac{1}{2}$ inches.

Agriopsis Aprilina : the Marveil-du-Jour (Plate IX., Fig. 12).—Expanse, to $1\frac{3}{4}$ inches. Common, but local. Occurs with the last species at sugar in September. I need hardly repeat the caution not to kill this fine species with ammonia. Of all the colours of insects, green is the most fleeting. The larva feeds on Oak. It hides during the day. Beat for it in June and July at night.

Phlogophora meticulosa : the Angle-Shades (Plate IX., Fig. 13).—Specimens of this fine moth are met with at sugar from May to November, although October is the month when it appears in some numbers. It has a bad

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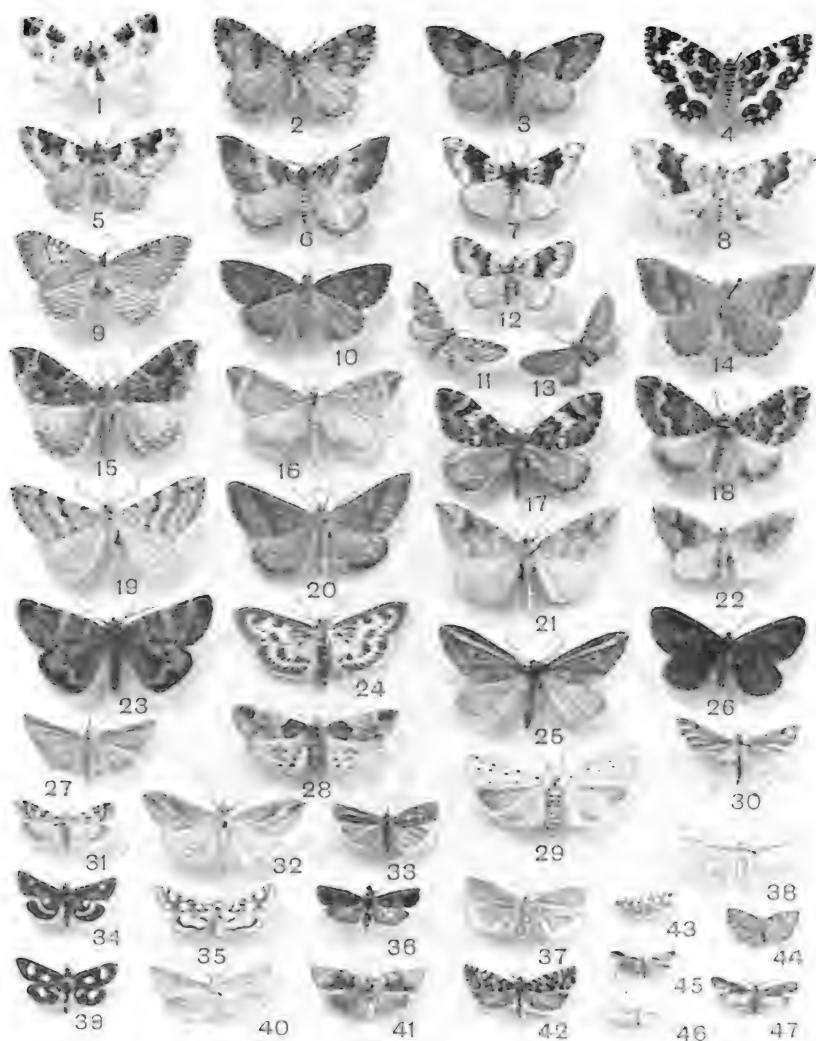
habit of appearing late at sugar, just as you are preparing to go home. The larva is a fairly general feeder, Goose-foot, Chickweed, and Dock, being perhaps the most favoured plants. Expanse of moth, nearly 2 inches.

Hadena oleracea : the Bright Line (Plate IX., Fig. 14).—A common garden species everywhere. It varies very little. Comes to sugar abundantly. The larva (Plate XIV., Fig. 7) attacks most garden plants, Lettuce, Cabbage, Nasturtiums, being perhaps the favourites. It is either brown or green, with a light line on either side, and dotted all over with very fine black spots. Look in August and September for the larva, June and July for the moth. Expanse, $1\frac{1}{2}$ inches.

Family XYLINIDÆ

Calocampa vetusta : the Red Sword Grass (Plate IX., Fig. 15).—One of the moths we see at sugar in September and October. When at rest it has a curious way of folding its wings ; they appear as if wrapped round the body, and the moth looks like a bit of rotten stick or a curled leaf. The females usually survive the winter, and reappear at Sallow catkins in spring. The larvæ feed on low plants on swampy ground ; hence you will find the moth commonest at sugar on trees near a marsh. Expanse, 2 inches.

Cucullia verbasci : the Mullein Shark (Plate IX., Fig. 16).—The Sharks are quite a distinct little group. We have eight species, which may be taken at bloom or occasionally at rest on palings, or, better still, bred. The larvæ of most of them live upon various species of



- | | | | |
|-----------------|------------------|-------------------|----------------------|
| 1 M. bicolorata | 13 E. vulgata | 25 C. spartiata | 37 T. viridana |
| 2 F. sordidata | 14 E. bilineata | 26 C. atrata | 38 A. galactodactyla |
| 3 F. obeliseata | 15 C. prunata | 27 C. tristellus | 39 E. octomaculata |
| 4 E. hastata | 16 C. testata | 28 C. farinalis | 40 S. lutealis |
| 5 C. fluctuata | 17 C. immanata | 29 C. cribrum | 41 E. ribeana |
| 6 A. badiata | 18 C. suffumata | 30 C. gonodactyla | 42 M. Schulziana |
| 7 M. ocellata | 19 A. plagiatata | 31 S. dubitalis | 43 A. brochella |
| 8 M. montanata | 20 E. limitata | 32 C. forficatus | 44 E. Bergmanniana |
| 9 E. undulata | 21 C. populata | 33 C. pratellus | 45 C. alchemiella |
| 10 C. siderata | 22 C. fulvata | 34 C. purpuralis | 46 E. argentella |
| 11 E. nanata | 23 B. parthenias | 35 E. stagnata | 47 D. sulphurella |
| 12 C. designata | 24 E. urticata | 36 C. pomonella | |

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Mullein and Figwort in June and July (see Plate XIV., Fig. 8). Moth appears in May. Expanse, $1\frac{3}{4}$ inches.

Family GONOPTERIDÆ.

Gonoptera libatrix: the Herald (Plate IX., Fig. 17).—Expanse, $1\frac{1}{2}$ inches. Herald of the approaching winter, it much resembles an autumn leaf. It is common in most districts at sugar in September. Larva on Poplar and Sallow, between fastened leaves, in June and July. It is green, with a yellow line on either side.

Family PLUSIIDÆ.

Habrostola tripartita: the Spectacle Moth (Plate IX., Fig. 18).—Expanse, $1\frac{1}{4}$ inches. Looks out upon the world *from under its spectacles*, and as a result of its survey it wears a rather wise and puzzled expression—a droll conceit. The moth is common at bloom in July, and the green, diagonally-marked larva (Plate XIV., Fig. 10) can be got plentifully from Nettles in August.

Plusia chrysis: the Burnished Brass (Plate IX., Fig. 19).—There are nine species of *Plusia* taken in Britain, some of them common, some frequent, and two rather rare. They are all strikingly beautiful; they scintillate and shimmer with patches of iridescent gold. They all come to flowers, both in field and garden. Willow-Herb, Sweet-William, Turncap Lilies, Delphiniums, Ragged - Robin, Wood - Sage, Heather, Thistles, Honeysuckle, Woundworts, and many others, are all visited by this interesting family. Two of them fly boldly in the sunshine—*Interrogationis* at Heather,

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and *Gamma* at Thistles, etc. *Interrogationis* can also be taken at rest on rocks and boulders on heathery hillsides in dull weather, but it is rather difficult to recognize on account of the extreme similarity it bears to its surroundings. *Chrysitis* is very common, and the green larva can be beaten from Nettles in May and June. The moth is out in July. Expanse, $1\frac{1}{2}$ inches.

Plusia festuæ: the Gold Spot (Plate IX., Fig. 21).—Expanse, slightly under $1\frac{1}{2}$ inches. Widely distributed; locally common. It is easily scared, and, if you set out to capture a few in a garden, see that for the time being you have the whole place to yourself; anyone else wandering idly about amongst the flowers will be quite sufficient to keep all the *Plusiæ* at a distance. The larvæ feed on grass, and hibernate.

Plusia gamma: the Silver Y (Plate IX., Fig. 20).—Expanse, $1\frac{5}{8}$ inches. Common everywhere from May till September. Larva on Nettles, Dock, and other low plants; in the garden, on Lettuce. In common with the other *Plusiidæ*, it spins a slight web in a turned-over portion of a leaf, and pupates therein.

Family HELIOTHIDÆ.

Anarta myrtilli: the Beautiful Yellow Underwing (Plate IX., Fig. 22).—A child of the heathery waste, delighting in flying in the bright sunshine, and pausing now and again to sip the nectar from the Heather-bells. From June to July is the time. The larvæ hibernate, but can be taken commonly in the autumn or spring by beating the Heather; they hide near the

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roots during the day. It is a beautiful little green larva (see Plate II., Fig. 4) with a diagonal pattern in white and yellow all over it. Breed it. The moth is difficult to catch; it is both speedy and wary. Expanse, just under 1 inch.

Family EUCLIDIIDÆ.

Euclidia glyphica: the Burnet Companion (Plate IX., Fig. 23).—Common locally; widely distributed on waste commons and near the coast; flies occasionally during the day. Larva on Trefoil and Clover in May. Moth in June and July. Expanse, 1 inch.

Family CATOCALIDÆ.

Catocala nupta: the Red Underwing (Plate IX., Fig. 25).—Expanse, to 3 inches. There are four moths in this family, all large and handsome; confined to the southern half of England. Taken at sugar and light from July to September. Larva on Poplar and Willow from May to July.

Family HYPENIDÆ.

Hypena proboscidalis: the Snout (Plate IX., Fig. 24). Expanse, $1\frac{1}{4}$ inches.—Exceedingly common in July and August wherever Nettles abound. The Snout is typical of the family; they have all more or less prolonged palpi, hence the name. The larvæ feed on Nettles from May to June; they are green, tapering somewhat to both ends.

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Family BREPHIDES.

Brepbos parthenias: the Orange Underwing (Plate XIII., Fig. 23).—Expanse, $1\frac{1}{4}$ inches. Flies in the sunshine among the bare Birch twigs in March and April. Larva in July on Birch and Oak.

We now come to the GEOMETRÆ, or “loopers,” a fairly large and distinct group having several well-defined characteristics easy to recognize and remember. The method of progression of the larvæ is peculiar; they have only one pair of pro-legs, on the tenth segment, and the anal claspers on the twelfth; grasping a twig with the six front-legs, they draw the end of the body up until the pro-legs almost touch the front-legs, thus forming themselves into a loop. Taking a firm hold with the claspers, the head and fore-legs are again extended for a fresh hold, and so on. In this manner they can travel very quickly. Many of them do not care, or need, to conceal themselves during the day; holding on by the pro-legs and claspers, they extend themselves at an angle of about 75 degrees, and in this position they will remain motionless for hours, imitating, of course, a leafless twig; they thus escape the keen eyes of birds and other possible enemies.

The moths themselves generally have slender bodies and ample wings; they do not come to sugar except on rare occasions, and the same may be said in respect to flowers. Their flight is not of the dashing order, hence they are not difficult to capture with the net.

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Trees, bushes, and general herbage, yield plenty of them by beating. Any exceptions to these general rules will be treated of as we describe the types we have selected for illustration.

GEOMETRÆ.—Family UROPTERYGIDÆ.

Uropteryx sambucaria: the Swallow-Tail (Plate XII., Fig. 1).—Expanse, to $2\frac{1}{4}$ inches. Confined to the southern half of the kingdom; common about London, but local. The larvæ feed on a great variety of trees and shrubs—Elder, Lime, Holly, Ivy, Bramble, Honeysuckle—from September till May.

Family ENNOMIDÆ.

Rumia luteolata: the Brimstone (Plate XII., Fig. 2).—Expanse, to $1\frac{1}{2}$ inches. One of the commonest hedgerow moths. The main brood comes out in June; but the moth is met with throughout the summer. Larva on Hawthorn.

Angerona prunaria: the Orange Moth (Plate XII., Fig. 3). Expanse, $1\frac{3}{4}$ inches.—One of the most variable moths we have. On the wing in June and July. The larva may be got from September to April on Plum, Sloe, Bramble, Sallow, Hawthorn, and many other trees and shrubs.

Metrocampa margaritaria: the Light Emerald (Plate XII., Fig. 5).—Expanse, $1\frac{5}{8}$ inches. Must not be killed with ammonia; its delicate green tint is all too fleeting, but with care, and as little as possible

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exposure to the light, much of its charm may be retained. Moth in June and July. Larva on Beech and Oak from September to May.

Pericallia bilunaria: the Early Thorn (Plate XII., Fig. 4).—The Thorn Moths (of which there are about a dozen) derive their name from the fact that their larvæ, when at rest, greatly resemble a short branch or thorn. The Early Thorn is one of the first to appear, and is occasionally double-brooded; the spring form being larger and finer than the autumn one. The larvæ may be beaten from Hawthorn, Oak, or Willow, during the summer months. The moth in April and May. Expanse, $1\frac{1}{2}$ to $1\frac{3}{4}$ inches.

Crocallis elinguaris: the Scalloped Oak (Plate XII., Fig. 6).—Does not confine its attention to Oak. I once came upon quite a number of the larvæ destroying my favourite rose-bushes; Birch, Willow, and Hawthorn are also attacked. May and June for the larva; July and August for the moth, which is common everywhere. Expanse, $1\frac{1}{2}$ inches.

Family AMPHIDASYDÆ.

Phigalia pedaria: the Pale Brindle Beauty (Plate XII., Fig. 7; female, 7A).—Presents us with a remarkable feature in moth life—the wingless female; how this has come to pass is a problem for the evolutionists. We shall meet with other examples as we progress. We would note, however, that all the wingless species appear either very late in the autumn or very early in the spring, just when protection from frost

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is essential to their existence. A wingless insect finds the necessary shelter in cracks and crannies and under bark, where wings would never go. Thus it survives, reappearing in the milder weather to continue its egg-laying career. *Pedaria* occurs all over the British Isles, but you must look for it early in the year; February is not too soon. The moths may be found at rest on the trunks of Oak and Beech. I have even taken them while snow lay in patches in the woodland. Larva on Oak, Beech, and Birch, during the summer. Expanse of moth, $1\frac{1}{2}$ inches.

Amphidasys strataria: the Oak Beauty (Plate XII., Fig. 13).—Expanse, $1\frac{3}{4}$ to 2 inches. Fairly common, but local—one of our prettiest loopers. The figure is of a female. The males have finely-feathered antennæ. An early moth, making its appearance in March. The larvæ may be had throughout the summer on Oak and other trees.

Amphidasys betularia: the Peppered Moth (Plate XII., Fig. 12).—Expanse, to $2\frac{1}{4}$ inches. Females a bit larger than the males. The moth comes out towards the end of May, and is widely spread and common. There is a sooty-black variety which has become commoner of recent years (Var. *Doubledayaria*). Larva on Beech, Oak, Birch, Sallow, etc., from August to October.

Family BOARMIIDÆ.

Cleora lichenaria: the Brussels Lace (Plate XII., Fig. 20).—Rather a local insect, but it occurs North and South in woodlands where the trees bear a good coating

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of lichens; for it is upon these that the larvæ feed. They are singularly beautiful; green, black, and yellow mottled, they resemble their food so much in colour and wrinkledness that, so long as they remain still, they are practically invisible. Larva in May; moth in June and July. Expanse, to $1\frac{1}{4}$ inches.

Boarmia gemmaria: the Willow Beauty (Plate XII., Fig. 33).—Expanse, $1\frac{5}{8}$ inches. A very variable species belonging to a variable group. Var. *Perfumaria* is perhaps the most notable; it has a broad black bar across both upper and under wings. The moth appears in July and August. The larva is a very general feeder, attacking Oak, Willow, Bilberry, Birch, Elm, Ivy. Common everywhere.

Tephrosia biundularia: the Engrailed (Plate XII., Fig. 23).—Expanse to $1\frac{1}{2}$ inches. Also very variable; in fact, every district seems to have its own form. Moth in April and May; larva during the summer, on Oak, Birch, Larch, etc.

Family GEOMETRIDÆ.

Geometra papilionaria: the Large Emerald (Plate XII., Fig. 17).—Not a very common moth, but very widely distributed; may be looked for wherever there are Birch plantations. Flies rather high at dusk, settling from time to time just beyond the reach of the net; a shake of the tree, and it is off again. The larvæ hibernate, so it is best to look for them in the spring: April and May. Out in July. Expanse, 2 to $2\frac{1}{4}$ inches.



1. Larva of *Arctia caia*
 1A. Cocoon of *A. caia*
 2. Larva of *Spilosoma lubricipeda*
 3. Larva of *Euchelia Jacobæ*
 4. Larva of *Arctia villica*
 5. Larva of *Spilosoma fuliginosa*

- 5A. Cocoon of *S. fuliginosa*
 6. Larva of *S. menthastri*
 7. Larva of *Hadenæ oleracea*
 8. Larva of *Cucullia verbasci*
 9. Larva of *Mamestra brassicæ*
 10. Larva of *Habrostola tripartita*

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Family EPHYRIDÆ.

Zonosoma punctaria: the Maiden's Blush (Plate XII., Fig. 11).—Expanse, $1\frac{1}{8}$ inches. The rosy blush on the centre of the fore-wing is not always present; on the other hand, the wing sometimes "blushes like a rose." The moth is out in June; larva on Oak in August and September.

Family ACIDALIIDÆ.

Acidalia bisetata: the Fan-Footed Wave (Plate XII., Fig. 14).—Expanse, $\frac{3}{4}$ to $\frac{7}{8}$ inch. A very common little moth; out in July and August. Larva said to feed on withered leaves of Bramble, but I have always found it on Hazel.

Acidalia ornata: the Lace Border (Plate XII., Fig. 19).—Expanse, $\frac{7}{8}$ inch. A very delicate little moth, not uncommon; may be met with from May to August amongst Wild-Thyme, upon which the larva feeds from August to May.

Acidalia aversata: the Ribbon Wave (Plate XII., Fig. 32).—Expanse, to $1\frac{1}{8}$ inches. A common garden and hedgerow insect from June to July; the larva, which hibernates, can be got from September till May on various low plants.

Family CABERIDÆ.

Cabera pusaria: the White Wave (Plate XII., Fig. 18).—Expanse, to $1\frac{1}{4}$ inches. A summer snowflake; very common in thickets and woodlands in May and June. Larva, August and September on Sallow, Hazel, Oak, etc.

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Family MACARIIDÆ.

Halia vauaria: the V Moth (Plate XII., Fig. 21; larva, Plate X., Fig. 3).—Expanse, rather over $1\frac{1}{4}$ inches. Sometimes a garden pest on Currant and Gooseberry bushes in July; larva in May. There is a green and a brown variety.

Family FIDONIIDÆ.

Ematurga atomaria: the Common Heath (Plate XII., Fig. 28).—Expanse, to $1\frac{1}{8}$ inches. Common wherever there is Heather; in the North there is a dark brown variety devoid of markings. Moth in May; larva on Heather in autumn.

Bupalus piniaria: the Bordered White (Plate XII., Fig. 24).—Expanse, to $1\frac{3}{8}$ inches. The figure is of a male; the female is a light cinnamon brown. Very common in Pine-woods, and not always easy to net, as it has a dashing, irregular flight when disturbed during the day. Larva on Pine in August and September.

Family ZERENIDÆ.

Abraxas grossulariata: the Magpie (Plate XII., Fig. 16).—Expanse, $1\frac{3}{4}$ inches. Also called the Gooseberry Moth; often a veritable plague on Currant and Gooseberry bushes. In the country I have found it equally destructive on Sloe. There are many fine varieties. Moth in July; larva (Plate X., Fig. 6) in May and June.

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Family HYBERNIIDÆ.

Hybernia marginaria: the Dotted Border (Plate XII., Figs. 25 and 25a).—One of the commonest of our early moths. The female has only rudimentary wings. There is a local variety almost black. Larva on Hawthorn and Birch in June and July; moth in March. Expanse, to $1\frac{3}{8}$ inches.

Hybernia defoliaria: the Mottled Umber (Plate XII., Fig. 30).—Expanse, to $1\frac{3}{4}$ inches. The figure is that of a male; the female has not a vestige of wings. Moth out, October to December; larva on various trees in May and June. Common everywhere and very variable.

Family LARENTIIDÆ.

Cheimatobia brumata: the Winter Moth (Plate XII., Figs. 15 and 15A).—Female has small rudimentary wings. An orchard pest, and often works great destruction. Larva in May; moth in November and December. Expanse, $1\frac{1}{8}$ inches.

Oporabia dilutata: the November Moth (Plate XII., Fig. 27).—Expanse, to $1\frac{1}{2}$ inches. A woodland species, occurring when the trees are getting bare. It rests on the under-surface of the leaves, and may easily be disturbed and taken, usually in quantity, during the daytime early in November. Larva in May and June on Oak and other trees.

Larentia didymata: the Twin Spot Carpet (Plate XII., Fig. 10).—A common hedgerow moth. The figure is that of a male; the female is lighter and rather

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smaller. Larva on Primrose and other low roadside plants, in May ; moth, July and August. Expanse, nearly 1 inch.

Larentia cæsiata : the February Carpet (Plate XII., Fig. 8).—Why February? I cannot tell. The larva may be found on Bilberry in May and June, and the moth is out early in July. A common hillside species with a wide range of variation. Expanse, $1\frac{3}{8}$ inches.

Larentia viridaria : the Green Carpet (Plate XII., Fig. 22).—A common wayside species in most localities. The main point is to try and get fresh examples, when they are of a beautiful lively green colour, which, alas ! a day or two's exposure to the light turns to a sickly yellow. Larva on Bedstraws in August and September ; moth in June. Expanse, 1 inch.

Emmelesia albulata : the Grass Rivulet (Plate XII., Fig. 9).—Found in damp meadows in June. The Common Yellow-Rattle is the food-plant. Larva in August in the seed-pods. Expanse, $\frac{3}{4}$ inch.

Eupithecia venosata : the Netted Pug (Plate XII., Fig. 26).—The "Pugs" are a pretty numerous group, and some of them are so obscure in their markings as to render identification somewhat difficult ; the time of the year and the food-plant are valuable guides in this respect. However, with *Venosata* we have no difficulty ; it flies in May and June, and the larva can be found in July in the seed-pods of *Selene* and *Lychnis*. The Shetland variety of this moth is very dark, and specimens I captured on Ailsa Craig are very large. Expanse, to 1 inch.

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Eupithecia oblongata: the Lime Speck Pug (Plate XII., Fig. 29).—Fairly common, and comes freely to light. The larvæ feed on the seeds of Yarrow-Ragwort, Golden-Rod, etc., in August and September. Moth out in June and July. Expanse, $\frac{3}{4}$ inch.

Eupithecia satyrata: the Satyr Pug (Plate XII., Fig. 31).—Universally distributed, though local. The Heath variety (Var. *Callunaria*) swarms on some Scotch moors, where it feeds on the Heather; the type lives on various plants: Galium, Scabious, etc. Larva in September; moth in June. Expanse, to $\frac{3}{4}$ inch.

Eupithecia vulgata: the Common Pug (Plate XIII., Fig. 13).—Expanse, $\frac{7}{8}$ inch. A hedgerow species, and very common from May to August. Larva on Hawthorn and other plants from July to September.

Eupithecia nanata: the Narrow-Winged Pug (Plate XIII., Fig. 11).—Expanse, $\frac{7}{8}$ inch. A Heath-loving species, where it may be sought for at rest on rocks in May and June. Larva on the Heath flowers in August and September.

Thera obeliscata: the Shaded Broad-Bar (Plate XIII., Fig. 3).—Expanse, to $1\frac{1}{4}$ inches. A common species in all our Pine-woods in June, and again in September. Very variable. Larva on Pine in May and July.

Hypsipetes sordidata: the July High-Flyer (Plate XIII., Fig. 2).—Common everywhere, and very variable. About Sallow bushes; a black variety frequents heaths. Larva (Plate X., Fig. 2) from September to May; moth, June and July. Expanse, to $1\frac{1}{4}$ inches.

Melanthia bicolorata: the Blue-Bordered Carpet

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(Plate XIII., Fig. 1).—Expanse, 1 inch. Common in July on Alders. Varies greatly from the type to “all black.” Larva in May and June.

Melanthia ocellata : the Purple-Barred Carpet (Plate XIII., Fig. 7).—Common on sunny banks where Bed-straw grows ; the larvæ feed on this plant in July and August. The moth is out in June. Expanse, 1 inch.

Melanippe hastata : the Argent and Sable (Plate XIII., Fig. 4).—On Bog-Myrtle and Birch, especially the former. The larvæ are easily gathered, as they draw together the terminal leaves of the new growth and bind them securely with silk ; inside this rather roomy tent they are protected from the weather, but not from ichneumons, as I have found a large percentage of them are “stung” when gathered for rearing. A local moth, but swarming on some moorlands. Expanse, $1\frac{1}{4}$ inches.

Melanippe montanata : the Silver-Ground Carpet (Plate XIII., Fig. 8).—Expanse, $1\frac{1}{8}$ inches. The commonest of all the Carpets. Out in June and July ; larva from September to April, on Primrose, Galium, Wood-Sage, etc.

Melanippe fluctuata : the Garden Carpet (Plate XIII., Fig. 5).—Expanse, 1 inch. In gardens everywhere ; larva will eat almost anything green. Moth rests on walls during the daytime ; it varies considerably, and is double-brooded—out in spring and autumn. Larva during the summer (see Plate X., Fig. 5).

Anticlea badiata : the Scorched Carpet (Plate XIII., Fig. 6).—Expanse, to $1\frac{1}{4}$ inches. Appears early in the spring, March and April, flying about the leafless Rose-

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bushes. I have taken it at late Sallow catkins. Larva in June on Rose-bushes.

Coremia designata: the Flame (Plate XIII., Fig. 12).—Expanse, to 1 inch. A common and widely distributed species; double-brooded, the first lot appearing in May and June, and the second in August. Larva in the intrin on Bedstraw and Primrose.

Camptogramma bilineata: the Yellow Shell (Plate XIII., Fig. 14).—Expanse, $1\frac{1}{8}$ inches. On every hedgerow in June; larva on the low plants under the hedge in April. Look out for varieties; there are some very striking ones.

Eucosmia undulata: the Scallop Shell (Plate XIII., Fig. 9).—Expanse, to $1\frac{1}{4}$ inches. A marvel of fine waved lines. Only a moderately common species. It appears in June and July; larva in September, between leaves of Sallow and Poplar.

Cidaria siderata: the Parrot Carpet (Plate XIII., Fig. 10).—Expanse, $1\frac{1}{8}$ inches. A lovely dark green moth appearing in September. In July and August you can beat the larva from Lime-trees.

Cidaria immanata: the Marbled Carpet (Plate XIII., Fig. 17).—Expanse, to $1\frac{3}{8}$ inches. A very common and exceedingly variable species, appearing about the end of August. Larva on Sallow, Birch, and Strawberry, from May to July.

Cidaria suffumata: the Water Carpet (Plate XIII., Fig. 18).—A local insect, but usually plentiful where it occurs. In April and early May is the time to look for it. Comes freely to late Sallow catkins. Larva in the

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autumn on *Galium mollugo* and *Galium aparine*; comes up to feed at night. There is a black variety of the moth (Var. *Piceata*). Expanse, to $1\frac{1}{4}$ inches.

Cidaria prunata: the Phoenix (Plate XIII., Fig. 15).—Expanse, to $1\frac{1}{2}$ inches. A local garden moth appearing about the end of July. The larvæ attack Black Currant bushes in May and June. Shake the bushes over an inverted umbrella, into which they will readily drop.

Cidaria testata: the Chevron (Plate XIII., Fig. 16).—Expanse, to $1\frac{1}{4}$ inches. Common everywhere in August. Larva on Sallow, Birch, Alder, and, on moorlands, on Heather, in May and June.

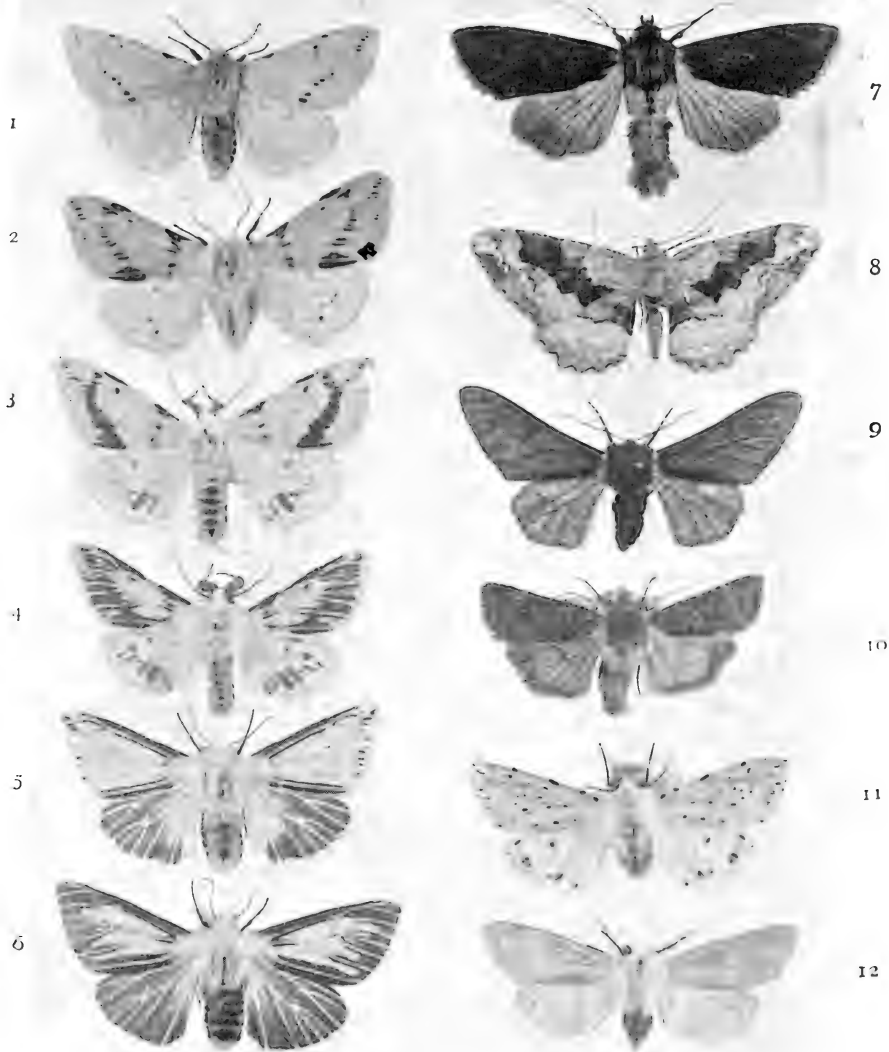
Cidaria populata: the Northern Spinach (Plate XIII., Fig. 21).—Expanse, to $1\frac{1}{4}$ inches. Common among Bilberry in July. There are some beautiful dark purple forms from the mountainous districts of Scotland. Larva in May on Bilberry.

Cidaria fulvata: the Barred Yellow (Plate XIII., Fig. 22).—Expanse, slightly over 1 inch. Common about Rose-bushes in June and July; frequent in suburban gardens. Larva on Rose-bushes in May.

Family EUBOLIIDÆ.

Eubolia limitata: the Small Mallow (Plate XIII., Fig. 20).—A common wayside moth found almost everywhere. Larva on Grasses in May; moth in August. Expanse, to $1\frac{3}{8}$ inches.

Anaitis plagiata: the Treble Bar (Plate XIII., Fig. 19).—Expanse, to $1\frac{5}{8}$ inches. In moorland districts, where the smaller varieties of St. John's-Wort are



SOME STRIKING VARIETIES

1. Type of *Spilosoma lubricipeda*
- 2 to 6. Some variations of same
7. *Xylophasia monoglypha*, black form
8. *Boarmia gemmaria*, var. *Perfumaria*

9. *Amphidasys betularia*, var. *Double-dayaria*
10. *Triphaena comes*, dark form
11. *Spilosoma menthastris*
12. *S. menthastris*

} varieties

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plentiful, this fine moth can be taken in some quantity at rest on the rocks or low stone walls. The moth in August; the larva from October to April.

Chesias spartiata: the Streak (Plate XIII., Fig. 25).—Expanse, to $1\frac{3}{8}$ inches. Must be looked for where Broom abounds, and there it is generally common enough in the dusk of the September evenings. The larva can be beaten from Broom in May and June.

Family SIONIDÆ.

Tanagra atrata: the Sweep (Plate XIII., Fig. 26). Expanse, 1 inch. All sooty black except the extreme tips of the fore-wings, which are bordered with white—an odd little moth flying in the daytime in meadowlands in June. Larva in May on Rough-Chervil, and probably on other Umbelliferæ.

The types we have been considering are all of comparatively large size, and so are called Macro-Lepidoptera. We now propose to briefly touch on the Micro-Lepidoptera. They are all much smaller; some, indeed, are very minute. But what they lack in size they more than make up for in numbers, and, we may add, in economic importance. Some attack growing crops; others are found in warehouses and stores. Grains, roots, fruits, timber, furniture, textiles, furs, are all food for some of these little marauders. The great majority, however, prefer the country life, and have their likes and dislikes as to food-plants, just like their larger brethren. There are five distinct groups of

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them, and in the quantity of species they far outnumber the "Macros." Here we can describe only a type or two from each group, and thus give a glimpse of the promised land, into which the beginner can enter when he has earned his spurs as an entomological expert.

First, then, we will take the Pyralides.

Family PYRALIDIDÆ.

Pyralis farinalis: the Meal Moth (Plate XIII., Fig. 28).—A common species in grain-stores, barns, stables, and similar situations. The larvæ feed upon chaff, hayseed, etc. Moth appears throughout the summer. Expanse, to 1 inch.

Scoparia dubitalis: the Hoary Grey (Plate XIII., Fig. 31).—There are twenty species in the genus, and it is no easy matter to settle the identity of some of them. They are commonly found at rest on the trunks of trees and lichen-covered rocks. The larvæ are lichen feeders. The moths appear in May and June. Expanse, $\frac{3}{4}$ inch.

Pyrausta purpuralis: the Crimson and Gold (Plate XIII., Fig. 34).—Expanse, to $\frac{3}{4}$ inch. Has a liking for the dry uplands near our coasts; out in June, and flies in the sunshine. Larva said to feed on Wild-Mint, but I have taken it where that could not possibly be the food.

Ennychia octomaculata: the White Spot (Plate XIII., Fig. 39).—A local woodland species appearing in mid-summer. Its eight white spots are unmistakable. Expanse, $\frac{3}{4}$ inch.

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Family BOTYDÆ.

Eurrhypara urticata: the Small Magpie Moth (Plate XIII., Fig. 24).—Expanse, to $1\frac{1}{8}$ inches. Common among Nettles in June and July. Larva will be found on Nettles during September.

Scopula lutealis: the Clouded Pearl (Plate XIII., Fig. 40).—Expanse, 1 inch. A common wayside species often met with during the day or the early evening at the flowers of Thistles, Knapweed, and Bramble. Larva in May on Coltsfoot.

Pionea forficaris: the Garden Pearl (Plate XIII., Fig. 32).—Expanse, $1\frac{1}{8}$ inches. Common everywhere. Town and suburban gardens are its favourite resorts. Out in June; the larvæ may be found in September.

Family HYDROCAMPIDÆ.

Hydrocampa stagnata: the China Mark (Plate XIII., Fig. 35).—*Hydrocampa* means “water-caterpillar.” There are five members of this little family, and they are all found about marshes or the borders of ponds and canals. The larvæ feed upon aquatic plants, such as Potamogeton and Lemna. The moths are usually plentiful, fluttering amongst the reeds in June and July. Expanse, $\frac{7}{8}$ inch.

PTEROPHORI (THE PLUME WINGS).

Family PTEROPHORIDÆ.

Platyptilia gonodactyla (Plate XIII., Fig. 30).—The “Plumes” are a curious little group. There are about

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a dozen genera and three dozen species ; some of them are common, others rare. *Gonodactyla* is common wherever Coltsfoot is abundant. The larvæ feed in the stems of the flowers in March ; the moths are out in June. Expanse, 1 inch.

Acipitilia galactodactyla (Plate XIII., Fig. 38).—Expanse, to 1 inch. Like a little ragged snowflake in a melting mood ; one almost expects to see it dissolve in the heat of July. Local, amongst Burdock. Larva in May.

CRAMBI (THE GRASS MOTHS).

Family CRAMBIDÆ.

Crambus pratellus (Plate XIII., Fig. 33).—The grass moths are known to everyone who has walked over grass. They start up before us, flutter a little in advance, and then settle down again. They look quite large on the wing, the under-wings being ample ; but when they settle they resemble more a grain of corn, the wings then being folded tightly round the body. *Pratellus* is out in June, and again in August. Expanse, to $\frac{3}{4}$ inch.

Crambus tristellus (Plate XIII., Fig. 27).—Equally common as the last-named in July and August. Expanse, 1 inch.

Myelophila cribrum (Plate XIII., Fig. 29).—Expanse, $1\frac{1}{8}$ inches. A local species, not very abundant ; confined mostly to the South of England. The moth appears in July and August. The larva can be found from the late autumn to early summer in Thistle-stalks.

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TORTRICES.—Family TORTRICIDÆ.

Tortrix ribeana (Plate XIII., Fig. 41).—Expanse, to $\frac{7}{8}$ inch. The Tortrix group is a very big one, though the individual members are small. Few of their larvæ feed openly. Some spin webs to live under, but the great majority are leaf-rollers, and can be recognized by their wriggling and twisting when disturbed in their home. *Ribeana* can be found on every hedgerow. It varies in colour from light ochreous to dark brown. Out in June and July. The larva in rolled leaves of Hawthorn in May and June.

Tortrix viridana (Plate XIII., Fig. 37).—Expanse, to $\frac{7}{8}$ inch. All over the British Isles on Oak, the larvæ occasionally stripping the trees bare, and proving a rather injurious pest. Moth in July ; larva in June.

Dictyopteryx Bergmanniana (Plate XIII., Fig. 44).—A beautiful little golden sprite, loving to dance about Wild-Rose bushes, and occasionally on Garden Roses. Larva in May, moth in June. Expanse, $\frac{1}{2}$ inch.

Mixodia Schulziana (Plate XIII., Fig. 42).—Expanse, to 1 inch. A large Tortrix found upon moorlands, sporting over the Heather in the daytime. It appears at the end of June. Larva on Heather in the autumn.

Carpocapsa pomonella: the Codlin Moth (Plate XIII., Fig. 36).—Expanse, to $\frac{7}{8}$ inch. The little rascal which destroys our apples. On the wing in June. The larvæ are devouring our apples in the autumn.

Some British Moths Described

TINEÆ.—Family GELECHIIDÆ.

Dasycera sulphurella (Plate XIII., Fig. 47).—Had it been practicable, we should have had these little mites *enlarged* instead of reduced in size, as in our illustrations. There are hundreds of species of these Tineæ, and, although last in order and least in size, they come easily first in numbers. Some of them sparkle like living gems, others are like burnished gold; all are interesting; a few are destructive. *Sulphurella* is taken on marshy waste land in July. It is local, but common where it occurs. Expanse, $\frac{5}{8}$ inch.

Family ARGYRESTHIIDÆ.

Argyresthia brochella (Plate XIII., Fig. 43).—Lives upon Birch and Mountain-Ash, and is out in June. A common species, $\frac{7}{16}$ inch in expanse.

Family GRACILARIIDÆ.

Gracilaria alchimiella (Plate XIII., Fig. 45).—A little gem found abundantly on Oak-trees from June to August. Expanse, $\frac{1}{2}$ inch.

Elachista argentella (Plate XIII., Fig. 46).—Found at rest on Grass by the roadside in July. Common everywhere. Expanse, $\frac{1}{2}$ inch.

It remains for me to add that the dates given are for an average season in the Midlands of England. The dates for the South Coast will be at least ten days earlier, while those for Aberdeenshire will be a month later.

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